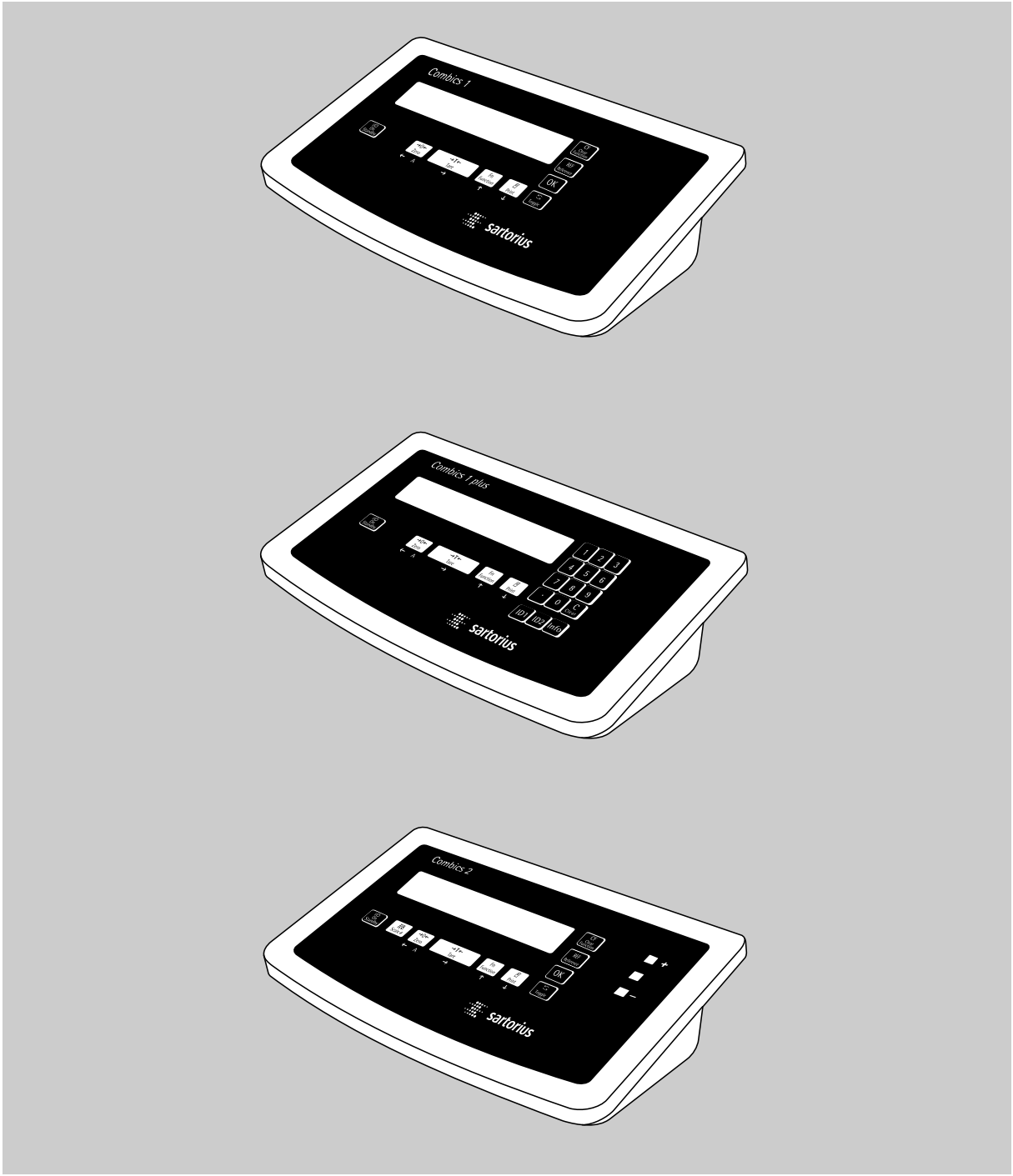
sartorius

Operating Instructions

Sartorius Combics 1 | Combics 1 plus | Combics 2

Models CISL1 | CISL1N | CISL2 | CIS1 | CIS1N | CIS2
Indicators



98648-010-85

Intended Use

Combics 1, Combics 1 plus and Combics 2 are rugged display and control units for the complex quality control tasks you perform every day. They meet the highest requirements placed on the accuracy and reliability of weighing results:

- in the food industry
- in the pharmaceutical industry
- in the chemical industry
- in the electronics and metal-working industries

Combics indicators are:

- Rugged and durable (stainless steel housing)
- Easy to clean and disinfect
- Easy to operate, thanks to the following features:
  - large, backlit display segments
  - large keys with positive click action
- Independent of the weighing instrument location
- Equipped with a range of interfaces for flexible use
- Password-protected from unauthorized changes in parameters (optional)

Combics 1 plus speeds up your routine procedures with:

- Input functions for tare values through numeric keypad
- Option for 2 alphanumeric lines to identify samples
- Connectivity for bar code scanner to enter tare values or ID codes

Combics 2 indicators have the following features:

- Built-in application programs:
  - Counting
  - Neutral measurement
  - Weighing in percent
  - Averaging
  - Checkweighing
  - Classification
  - Net-total formulation
  - Totalizing
- Automatic initialization when you switch on the Combics
- Automatic taring when a load is placed on the weighing instrument
- Optional remote control using an external computer

Symbols
The following symbols are used in these instructions:

● indicates required steps

○ describes what happens after you have performed a certain step

⚠ indicates a hazard

Hotline:
For advice on the use of these applictions, just call or fax your local Sartorius office. For the address, please visit our Internet website at: www.sartorius.com

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Warnings and Safety Precautions

Safety Information:

● Please read these operating instructions carefully before using your indicator to prevent damage to the equipment.

⚠ Do not use this equipment in hazardous areas.

⚠ Use only standard cables that have protective grounding conductors. The protective conductor must not be disconnected for any reason.

⚠ Disconnect the indicator from power before connecting or disconnecting peripheral devices.

⚠ The indicator may be opened only by trained service technicians.

⚠ If you operate the equipment under ambient conditions subject to higher safety standards, you must comply with the applicable installation regulations.

⚠ If there is visible damage to the equipment or power cord, unplug the equipment and make sure it cannot be used for the time being.

Installation:

– Proceed with extreme caution when using pre-wired RS-232 connecting cables from other manufacturers, as the pin assignments may not be compatible with Sartorius equipment. Check all pin assignments against the cabling diagrams and disconnect any lines that are not assigned.

– Connect only Sartorius accessories and options, as these are optimally designed for use with your Combics indicator. The operator shall be solely responsible for installation and testing of any modifications to Sartorius equipment, including connection of cables or equipment not supplied by Sartorius. Contact Sartorius for detailed operating specifications in accordance with the Standards for immunity to interference.

○ If you have any problems with your Combics indicator, contact your local Sartorius customer service center.

IP Rating:

– CISL models are rated to IP44 (with Option L1: IP65); CIS models are rated to IP67.

– The IP65/IP67 protection rating is ensured only if the rubber gasket is installed and all connections are fastened securely (including the caps on unused sockets). Weighing instruments must be installed and tested by a certified technician.

– If you install an interface port after setting up your indicator, keep the protective cap in a safe place for future use. The cap protects the interface connector from vapors, moisture and dust or dirt.

Using the Equipment in Legal Metrology in the EU*:

– When the indicator is connected to a weighing instrument and the resulting weighing instrument is to be verified, make sure to observe the applicable regulations regarding verification. When connecting a Sartorius weighing instrument, please observe the “Guide to Verification” on the enclosed CD and the permitted weighing range as listed in the Declaration of Conformity.

– EU legislation requires that a control seal be affixed to the verified device. The control seal consists of a sticker with the “Sartorius” logo. This seal will be irreparably damaged if you attempt to remove it. If any of the verification seals are damaged, make sure to observe the national regulations and standards applicable in your country in such cases. In some countries, the verification will become null and void and the equipment must be re-verified.

* Including the Signatories of the Agreement on the European Economic Area

Getting Started

Unpacking the Indicator

● Unpack the equipment and check it immediately for any visible damage.
○ If you detect any damage, proceed as directed in the chapter entitled "Care and Maintenance," under "Safety Inspection."
○ Save the box and all parts of the packaging for any future transport. Unplug all connected cables before packing the equipment.

Equipment Supplied

- Indicator
- Operating instructions (this manual)
- Special accessories listed on the bill of delivery, if ordered

Installation Instructions

Choose a location that is not subject to the following unfavorable conditions:

- Excessive temperatures (operating temperature range: -10°C to +40°C; +14°F to +104°F)
- Aggressive chemical vapors
- Excessive moisture (depends on IP rating)

Conditioning the Indicator

Moisture in the air can condense on cold surfaces whenever the equipment is moved to a substantially warmer place. To avoid the effects of condensation, condition the indicator for about 2 hours at room temperature, leaving it unplugged from AC power.

Connecting the Indicator to AC Power

● Check the voltage rating and the plug design. The indicator has a built-in power supply which can be operated with a supply voltage of 100 V to 240 V. The power connection must be made in accordance with the regulations applicable in your country.
⚠ To power a device of protection class 1, make sure the electrical outlet (mains supply) is properly installed with a protective grounding conductor (protective earth, PE).
⚠ If the electrical outlet does not have a protective grounding conductor, have a certified electrician install equivalent protection. The protective conductor must not be disconnected at any time.
⚠ Make absolutely sure to unplug the indicator from AC power before you connect or disconnect a peripheral device (printer or PC).
○ Switch off the equipment when not in use.

Note:

This equipment has been tested and found to comply with the limits pursuant to part 15 of FCC Rules. These limits are designed to provide reasonable protection against harmful interference. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with these instructions, may cause harmful interference to radio communications. For information on the specific limits and class of this equipment, please refer to the Declaration of Conformity. Depending on the particular class, you are either required or requested to correct the interference.

If you have a Class A digital device, you need to comply with the FCC statement as follows: "Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense."
If you have a Class B digital device, please read and follow the FCC information given below:
"[...]However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help."

Before you operate this equipment, check which FCC class (Class A or Class B) it has according to the Declaration of Conformity included. Be sure to observe the information of this Declaration.

Warmup Time

To ensure accurate results, the indicator must warm up for 30 minutes before operation. Only after this time will the indicator have reached the required operating temperature.
If the equipment is used in legal metrology, make sure to allow at least 24 hours warmup time after initial connection to AC power or after a relatively long power outage.

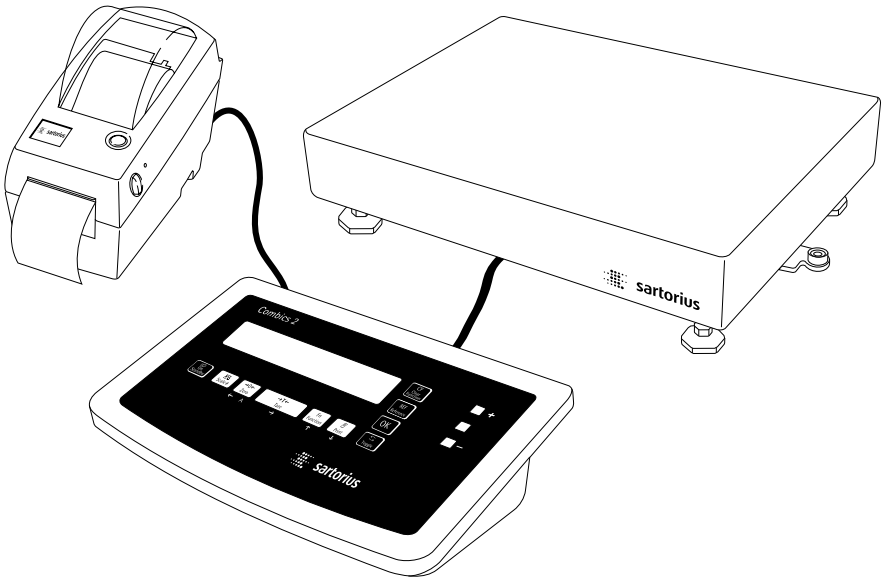
Installation Steps

1) Connect the weighing instrument to the indicator: see page 74

2) Configure the A/D converter: see page 78

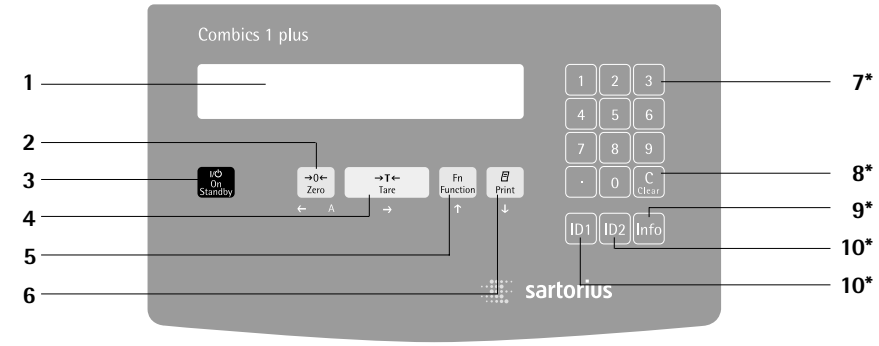
3) Perform calibration/adjustment: see page 20; see also page 85 for linearization

4) Connect peripheral devices (e.g., printer) to COM1 or UniCOM: see the chapter entitled "Data Interfaces," starting on page 89

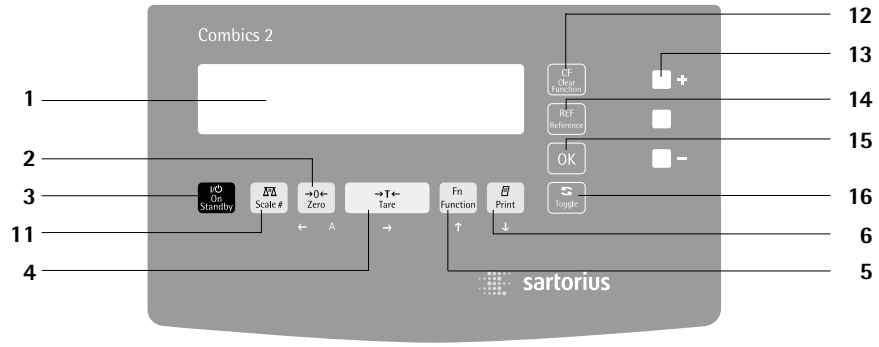


General View of the Equipment

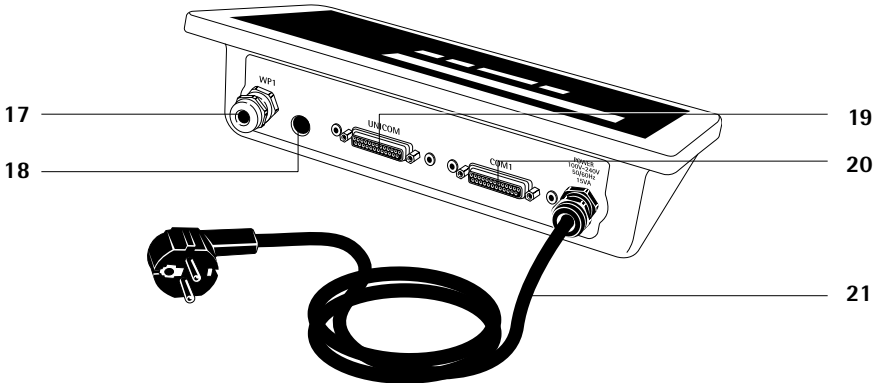
Display and keypad: Combics 1 and Combics 1 plus



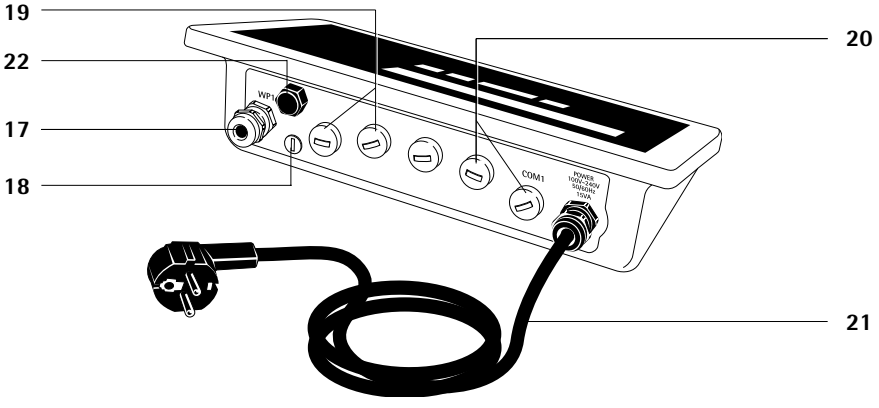
Display and keypad: Combics 2



Rear view: CISL models



Rear view: CIS models



Display and Keypad:

1 Display (for details, see "Operating Design")
2 Zero key
3 On/off key
4 Tare key
5 Function key (toggle gross/net, weight unit or to 10× higher resolution)
6 Print key (data output)

7* Numeric keypad for input
8* "Clear" key (deletes ID codes and tare input)
9* "Info" key (shows ID codes and tare input)
10* ID key (for entering ID codes)

11 WP toggle key (toggles active weighing instrument)
12 "Clear function" key (function depends on active application)
13 LEDs (for Checkweighing and Classification applications)
14 Reference value key (function depends on application)
15 "OK" key (function depends on application)
16 Toggle key (function depends on application)

* Combics 1 plus only

Rear view:

17 Connector for weighing instrument
18 Menu access switch
19 Second interface ("UniCOM") for external rechargeable battery and bar code scanner (Combics 2 only) – Other functions optional
20 RS-232C interface ("COM1") (standard equipment)
21 Power cord with country-specific plug
22 Vent valve; torque: 1.5 Nm

Operating Design

Keys
The operation of Combics 1, Combics 1 plus and Combics 2 involves just a few keys. These keys have one function during measurement and another during configuration. Some of the keys have one function when pressed briefly, and another when held for longer than 2 seconds.

If a key is inactive, this is indicated as follows when it is pressed:
- The error code "-------" is displayed for 2 seconds. The display then returns to the previous screen content.
- An acoustic signal (double-beep) is emitted.

Weighing/Measurement

Input Through the Keypad

Keys below the Display

[I/⏻] On/off key
(in standby mode, ₀FF is displayed).

[→0←]
- Press briefly: Zero the instrument
- Press and hold (> 2 sec): Show the adjustment/ configuration counter

[→T←]
- Tare the instrument
- Save numeric input as tare weight (Combics 1 plus only)
- Press and hold (> 2 sec): Start calibration/adjustment

[Fn] Toggle the display between (depends on configuration):
- first and second weight unit,
- gross and net values, or
- normal and 10-fold increased display resolution

[⎙]
- Press briefly: Print
- Press and hold (> 2 sec): Print GMP footer

[⚖] When two weighing instruments are connected, this key toggles the display between instruments (Combics 2 only).

Keys to the Right of the Display on Combics 1 plus
Keys for entering ID codes and tare values

[1], [2], [3]... [9], [·]
Numeric keypad for entering values that are identified by the key subsequently pressed (e.g., [→T←] for tare input or "ID" key for ID codes)

[C] Press to delete data (either ID code or tare input, depending on subsequent key; e.g., [→T←] for tare)
When pressed during numeric input: deletes the last character entered

[Info] Press to enter data (either ID code or tare value, depending on subsequent key; e.g., [→T←] for tare)

[ID1], [ID2]
Press to store or view ID codes (user-defined data to identify weight values)

Keys to the Right of the Display on Combics 2
These keys are used for operating applications. Please refer to the individual application descriptions for details.

[CF] Deletes initialization values or totalizing memory, depending on configuration.

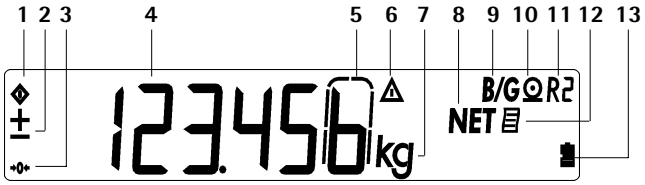
[REF] For modifying reference values.

[OK] Store a value or start an application program.

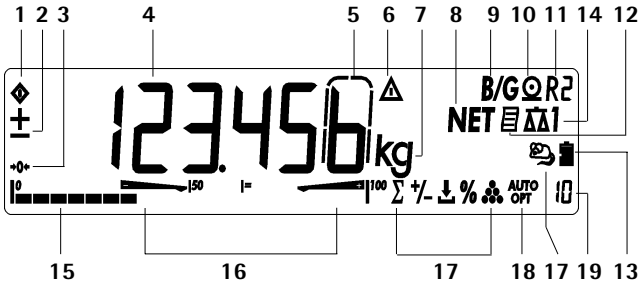
[⮌] Toggle between display modes within an application program

Input Through the Digital Input Port
The indicator is equipped with a control input (universal input port). You can connect a hand switch or foot switch to this port, if desired. Assign one of the following functions to this port in the operating menu:
- [⎙] key
- [⎙] (> 2 sec.)
- [→T←] key
- [→T←] key (> 2 sec.)
- [Fn] key
- [⚖] key
- [OK] key

Operating Design



Display during weighing/measurement
(Combics 1, Combics 1 plus) (example)



Display during weighing/measurement
(Combics 2) (example)

Display in Weighing Mode

The illustration above shows all of the main display elements and symbols shown during weighing.

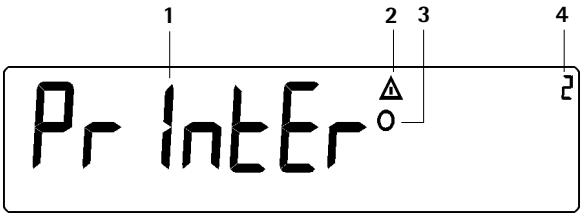
1 Busy symbol; indicates that an internal process is in progress
2 ± sign for the value displayed
3 Identifies “zero” as a weight value (after the weighing instrument has been zeroed)
4 Weight value or calculated value (main display)
5 In legal metrology, on equipment with e = d, the digit shown with a border is not valid
6 Identification of calculated value in the main display (value not valid in legal metrology)
7 Weight unit of the value displayed
8 Net value in the main display (when data is stored in tare memory)
9 Gross value in main display (when data is stored in tare memory)
10 Printing in progress
11 Display of the range on multiple-range instruments
12 GMP-compliant printing in progress (Combics 1 plus and Combics 2 only)
13 Battery symbol showing status of rechargeable battery (empty outline indicates battery is drained)
14 Indicates active weighing instrument; flashes to prompt calibration/ adjustment (Combics 2 only)
15 Bar graph (Combics 2 only)
- Shows how much of the available weighing capacity is “used up” by the current load, or
- Shows the measured value in relation to a target value (with the Checkweighing or Classification application)

16 Symbols for Checkweighing and classification (Combics 2 only)
17 Application symbols: Totalizing, Checkweighing, Classification, Net-total Formulation, Weighing in Percent, Counting and Neutral Measurement. For details, please refer to the the descriptions of the applications (Combics 2 only).
18 Symbols for reference updating (Combics 2 only)
- Auto: Depending on the weight value, a reaction is triggered in the application
- Opt: Automatic reference updating has been performed (Counting application)

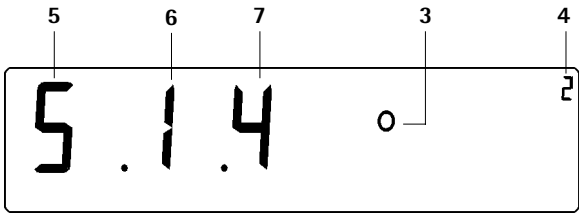
19 Numeric display; e.g., shows reference value (Combics 2 only)

Saving Data in Weighing Mode

All of the application parameters saved (e.g., reference values) remain stored and are still available when
- you switch the Combics off and then back on again
- you return to the originally selected application from a second one (for example, when you switch from Averaging back to Counting, all parameters saved for Counting are available)



Display of menu settings: Text menu (example)



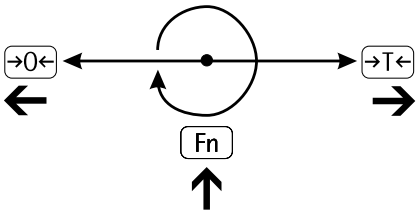
Display of menu settings: Numeric menu (example)

Configuration (Operating Menu)

Navigation and input in the operating menu are implemented using the keys below the display (on Combics 1 plus, numeric values can be entered using the numeric keypad)

Opening the Menu
Press the I/⏻ key to switch the Combics off and then on again; while all segments are displayed, press the →T← key briefly.

Navigating the Menu



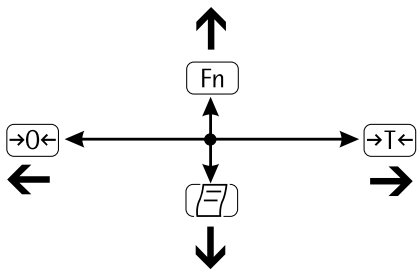
→0← Close the active submenu and return to next higher menu level ("back")

→T←
- Press briefly (< 2 sec): Select and store a menu item
- Press and hold (> 2 sec): Exit the menu

Fn Show the next item on the same menu level (the display scrolls through all items in series)

Print the menu settings starting from the current position, or print Info data

Alphanumeric Input in the Menu



→0←
- Press briefly: Activate character to the left of the current character (when first character is active: exit input mode without saving changes)
- Press and hold (> 2 sec): Exit the input mode without saving changes

→T←
- Press briefly (< 2 sec): Confirm currently active character and move 1 position to the right (after the last character: store input)
- Press and hold (> 2 sec): Store current input and display the menu item

Fn
- Cursor in first position, no characters entered yet: Delete character(s) and enter 0
- Change the displayed character; scroll forward (sequence: 0 to 9, decimal point, minus sign, Z to A, space)

- Cursor in first position, no characters entered yet: Delete entire string and enter a space
- Change the displayed character; scroll backwards (sequence: Space, A to Z, minus sign, decimal point, 9 to 0)

Numeric input in Combics 1 plus operating menu:
Enter values (date and time, etc.) using the 10-key numeric keypad

Display of Menu Settings
The illustration above shows all of the main display elements and symbols shown during menu configuration.

1. Selected menu item on text level (e.g., "Printer" for configuring the connected printer)
2. Indication that there are additional submenus
3. Indication that this is the currently active setting
4. Menu history (indicates the highest menu level)
5. Highest level in numeric menu
6. Second level in numeric menu
7. Third level in numeric menu

Saving Data in Configuration Mode
The parameters selected in the operating menu remain stored after you switch off the Combics.
You can prevent unauthorized changes in operating menu settings by requiring password input for menu access.

Weighing

The basic weighing function is available at all times.

Features:

- Zero the weighing instrument by pressing →0←
- Store the weight on the instrument as tare by pressing →T←
- Tare container weight automatically
- Enter tare weight through bar code scanner (Combics 1 plus and Combics 2 only)
- Enter tare weight through numeric keypad (Combics 1 plus only)
- Delete tare values by pressing 0 and →T← or C and →T← (Combics 1 plus only)
- Press Fn to toggle the display between:
  - Gross and net values,
  - 1st and 2nd weight unit, or
  - normal and 10-fold higher resolution
- Weighing with two weighing instruments (Combics 2 only)
- Individual data ID codes with numeric values for identifying weight values (Combics 1 plus only)
- Print weight value:
  - GMP-compliant printout
  - Automatic printing
  - Automatic data output (see "Data Interfaces")

Automatic Taring (Menu Item 3.7)
When menu item 3.7.2 is active, the first load placed on the weighing instrument that exceeds the specified minimum load is stored, at stability, in the tare memory.
The weighing instrument returns to the initial state when the load is less than 50% of the minimum load.

Minimum Load for Automatic Taring and Automatic Printing (Menu Item 3.5)
You can choose from the following settings for the minimum load:

1 digit (no minimum load)
2 digits
5 digits
10 digits
20 digits
50 digits
100 digits
200 digits
500 digits
1000 digits

The "digits" here refer to the intervals in the connected weighing instrument. If the interval of the connected instrument is 1 g, for example, and 1000 digits are required, the minimum load is 1000 g (=1000 digits).
If the interval of the connected instrument is 5 g and the same number of intervals is required as in the example above, the minimum load is 5000 g.

Once the load on the weighing instrument exceeds the specified minimum, the instrument is tared and/or a printout is generated, if the operating menu is configured for automatic taring (menu item 3.7.2) and/or automatic printing (menu item 7.13.2).

Automatic Printing (Menu Item 7.13)
When menu item 7.13.2 is active, the first weight value that exceeds the specified minimum load is printed.
If the menu code for automatic taring is also active, the weighing instrument is only tared when the minimum load is exceeded; the value is not printed.

First Weighing Instrument Displayed (Combics 2 only)
You can define which weighing instrument shows the first weight value when you switch on the Combics, under uE iL iE (menu item 8.9).

Entering Tare Weight using a Bar Code Scanner (Combics 1 plus and Combics 2 only)
You can enter the tare value of a container using a bar code scanner. To do this, the "Store value as tare" (tArE) menu item must be selected under "Setup > Bar code" in the operating menu. In this case, the value is stored as the tare automatically, without pressing the Tare key. The contents of the tare memory are display in Info mode (press and hold ⇆).

Entering ID Codes using a Bar Code Scanner (Combics 1 plus only)
You can use a bar code scanner to enter ID codes.
To do this, the "Store value as ID1" (id i) menu item must be selected under "Setup > Bar code" in the operating menu. In this case, the value is stored as ID1 automatically, without pressing the ID1 key.
To store the second ID code, the ID2 key must be pressed.
To view the stored ID codes:

- Press Info and ID1
- Press Info and ID2

Calibration/Configuration Counter on Standard Weighing Instruments

Purpose
These two mutually independent counters automatically keep track of changes made in calibration/adjustment parameters and in the operating menu. Counter values are stored in an EEPROM, and remain stored during the entire service life of this memory chip. To view the current values in the counter, press and hold the →0← key (longer than 2 sec). The readout shows the "configuration counter" value for 3 seconds first (identified by "P"). Then the "calibration counter" value is shown for 3 seconds (identified by "C"). The information display closes automatically after 6 seconds.

Features of the Calibration Counter:
- Limited to a count of 9999
- Counter set to "C 0000" when the hardware is first put into operation
- Counter cannot be reset
- The counter value is updated ("1" is added) automatically following:
  - Successful calibration/adjustment or linearization
  - Changes in the user-defined calibration/adjustment or linearization weight (menu item 1.18)
  - Changes in any of the following parameters:
    Function of the CAL key (menu item 1.9)
    Zero-setting range (menu item 1.11)
    Initial zero-setting range (menu item 1.12)
    Resetting of the above parameters to factory settings (menu item 9.1.1)

Features of the Configuration Counter:
- Limited to a count of 9999
- Counter set to "P 0000" when the hardware is first put into operation
- Counter cannot be reset
- The counter value is updated ("1" is added) automatically following:
  - Changes in the following parameters:
    Place of installation (menu item 1.1)
    Application filter (menu item 1.2)
    Stability range (menu item 1.3)
    Taring (menu item 1.5)
    Auto zero (menu item 1.6)
    Weight unit 1 (menu item 1.7)
    Weight unit 2 (menu item 3.1)
    Weight unit 3 (menu item 3.3)
    Resetting of the above parameters to factory settings (menu item 9.1.1)
  - Function of the Fn key changed to or from 10-fold higher resolution display
  - Activation or deactivation of application-dependent automatic taring (menu item 3.7)
  - Resetting of the application parameters to factory settings (menu code 9.1.1)

Device parameters

Password
You can prevent unauthorized changes in the device settings ("SEtuP") and application settings ("APPL," Combics 2 only) by assigning a password under "Setup > Code" (CodE; see also the chapter entitled "Configuration").

Acoustic Signal
An acoustic signal is emitted when you press a key (active key: single beep; inactive key: double-beep).
You can switch the acoustic signal off or on under "Setup > Utilities" (SEtuP, ut iL it) (menu item 8.2).

Keys
In the Setup menu under "ut iL it," you can block or release the keypad for input (menu item 8.3).

Automatic Power-off
In the Setup menu under "ut iL it" you can configure the Combics to shut down automatically following a specified interval of no user activity (menu item 8.7).

Display Backlighting
In the Setup menu under "ut iL it" you can choose from the following settings for the display backlighting:
- On (8.8.1)
- Off (8.8.2)
- Shut off after the specified time period has elapsed (8.8.3)

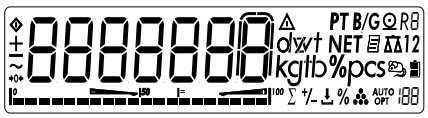
Timer Mode
In the Setup menu under "ut iL it" you can set the timer interval to 2, 4 or 10 minutes (menu item 8.9).

Operating

Example
Switch on the Combics, zero the weighing instrument, tare the container weight, place sample in container, toggle display to gross weight, 2nd weight unit or 10-fold increased resolution



Switch on the Combics



All display segments are shown for approx. 1 second (self-test)



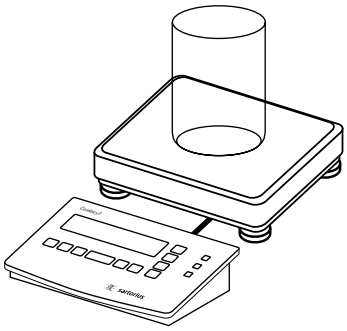
Display with no load on weighing instrument



Zero the weighing instrument



Display with no load on weighing instrument



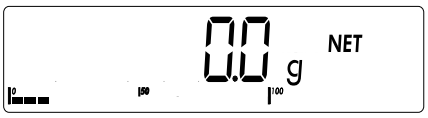
Place container on weighing instrument



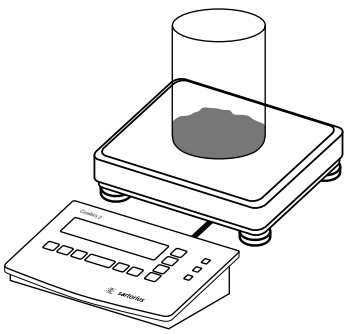
Container weight is displayed



Tare the weighing instrument



Display with tared container on weighing instrument



Place sample in container (in this example, 120.2 g)



Display with tared weighing instrument and sample in container

Fn

Toggle display; readout depends on your settings:



gross weight
(in this example, 50 g for container + 120.2 g substrate) or



display in 2nd weight unit (in this example, kg) or



display with 10-fold increased resolution

Fn

Return to previous readout
(if 10-fold increased resolution is shown, display returns to previous readout automatically after 10 seconds)



Print results

```
     ACE HARDWARE
      GOETTINGEN
24.02.2002      15:10
--------------------

G#      +     170.2 g
T       +      50.0 g
N       +     120.2 g
--------------------
```

Operating the Combics 1 plus

Example:
Combics 1 plus: Weighing with tare value entered using the numeric keypad; generate printout of results

I/⏻

Switch on the Combics 1 plus
The automatic self-test runs. Once a readout is shown, Combics 1 plus is automatically zeroed and ready to operate. With no load on the weighing instrument, you can zero the instrument at any time by pressing →0←.

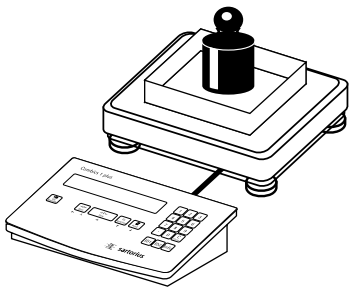
· 2 5

Enter the tare weight in the current weight unit using the keypad
(in this example, 0.25 kg).

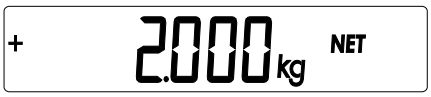


→T←

Tare the weighing instrument



Place container with sample on the weighing instrument



Read the result

Fn

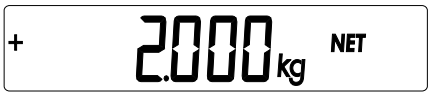
Toggle the display from net to gross weight values. The display shows



the gross weight
(in this example, 0.250 kg for the container plus 2.000 kg for the sample)

Fn

Toggle to display of net value



Print the results

```
--------------------
05.04.2004      10:09
Model            CIS1N
Ser.no.      12345678
Vers.     1.0001.04.4
BVers.       01-33-01
--------------------
ACE HARDWARE
GOETTINGEN
Batch no.       123456
Customer          6.789
05.04.2004      10:09
--------------------

G#     +     2.250 kg
T      +     0.000 kg
PT2    +     0.250 kg
N      +     2.000 kg
--------------------
--------------------
05.04.2004      10:10
Name:

--------------------
```

Start of GMP header (only if GMP-compliant printout is configured)

End of GMP header
Header lines

ID code 1
ID code 2

GMP footer (only if GMP-compliant printout is configured)

End of GMP footer

C + →T←

Delete tare weight entered through the keypad

or

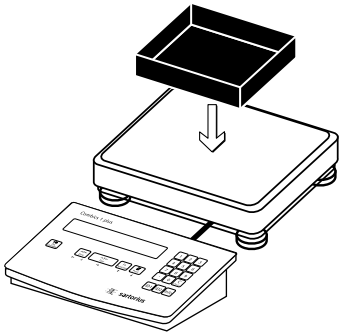
0 + →T←

Operating the Combics 1 plus

Example:
Combics 1 plus: Weighing with varying tare values; generate printout of results, delete tare values



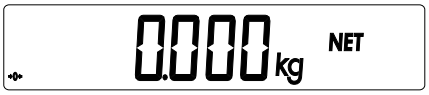
Switch on the Combics 1 plus
The automatic self-test runs. Once a readout is shown, the Combics is automatically zeroed and ready to operate. With no load on the weighing instrument, you can zero the instrument at any time by pressing →0←.



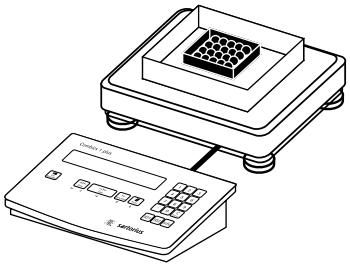
Place empty container on the weighing instrument



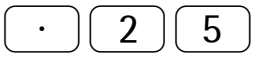
Tare the weighing instrument
Note: With the automatic tare function enabled, you do not need to press →T←
to tare the weighing instrument; the tare weight is stored automatically when you place the container on the weighing instrument.



Wait until a zero value is displayed together with the NET symbol.



Place packaged sample in the container

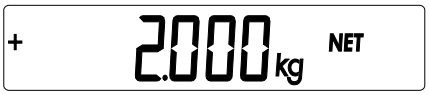


Enter the tare weight of the packaging in the current weight unit using the keypad (in this example, 0.25 kg).





Save the package weight. The package tare is added to the container tare.



Read off net weight



Print the results

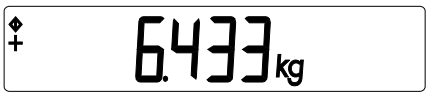
```
G#     +     6.433 kg
T      +     4.183 kg
PT2    +     0.250 kg
N      +     2.000 kg
--------------------
```



Enter a zero (“0”) using the keypad



Save the value entered. This deletes tare values; the display shows the gross value





Print the results

```
G#     +     6.433 kg
T      +     0.000 kg
N      +     6.433 kg
--------------------
```

Individual ID Codes (Identifiers)

You can assign ID codes (such as product name, batch number, etc.) while weighing, for identification of measured values.

Features

- Assign up to two ID codes.
- Assign both a name and a value for each ID code.
- The name is left-justified and the value is right-justified on the printout. If the entire code is too long for one line, additional lines are printed.
- Enter ID code names in Setup under: SEtuP: PrtProt (printouts): 7.4.3 (ID1) and 7.4.4 (ID2)
- Enter up to 20 characters for the ID code name. No more than 11 characters are displayed during input; all 20 characters are printed.
- Maximum length for values: 21 characters.
- Enter numeric values for ID codes using the numeric keypad and press [ID1] or [ID2] to save.
- To delete the last character entered in the ID code value: Press [C]
  To delete the entire ID code: Press [C] and then [ID1] or [ID2]
- If both the name and value fields are empty, no ID code is printed.
- Print ID codes: Refer to the Setup menu for menu item numbers. Data is output to COM1 menu item 7.7.x) or UniCOM (menu item 7.8.x).
- Show ID codes: Press [Info] and then [ID1] or [ID2]
- To store values entered using a bar code scanner: Scan the value for ID1

Function Keys

[ID1] or [ID2] Store the input as value for first or second ID code.

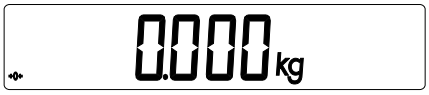
[C] Delete the selected ID code value

[Info] Display ID codes

Application Parameters: ID Codes

```
Setup
├─ PrtProt        Printouts
│  ├─ 7.4.        Input
│  │              ID code name
│  │  ├─ 7.4.3    ID1
│  │  └─ 7.4.4    ID2
│  ├─ 7.7         COM1: Configure
│  │              printout
│  │  └─ 7.7.6    ID1 and ID2
│  └─ 7.8         UniCOM:
│                 Configure
│                 printout
│     └─ 7.8.6    ID1 and ID2
```

Example:
Entering ID code values.
Enter “123.456” and “678.9” as values for ID codes 1 and 2.
See “Entering the Password” in the chapter entitled “Configuration” for details on how to enter ID code names.



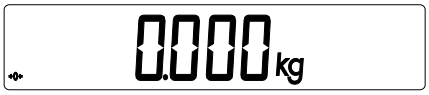
1 2 3 . 4 5 6

Enter value for ID code 1 (in this example, 123.456)



ID1

Confirm value for the first ID code



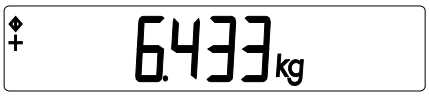
6 7 8 . 9

Enter value for ID code 2 (in this example, 678.9)



ID2

Confirm the value for the second ID code



Place container with sample on the weighing instrument

Print weight value (perform further weighing operations as desired, and print)

```
ID1          123.456
ID2            6.789
24.02.2003     10:09
--------------------
Ser.no.     12345678
G#     +    6.433 kg
T      +    0.000 kg
N      +    6.433 kg
```

ID code 1
ID code 2

C ID1

C ID2

Delete ID code:
You can delete each ID code individually when the weighing series has been completed.

Calibration and Adjustment

Purpose
The accuracy of weighing results must be carefully controlled. This is achieved through calibration and adjustment.

Perform calibration to determine the difference between the value displayed and the actual weight on the weighing instrument. Calibration does not entail making any changes within the weighing instrument.

The adjustment procedure actually eliminates the difference between the readout and the actual weight, or reduces it to a level within the permissible tolerance limits.

Features
Which of the following features are available depends on the weighing instrument:

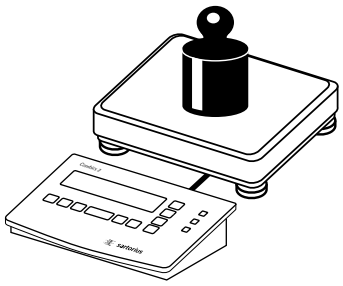
- External calibration/adjustment with the default weight value or standard weight (1.9.1) (not available on verified instruments)
- External calibration/adjustment with a user-defined weight (1.9.3) (not available on verified instruments)
- Internal calibration/adjustment for IS platform (1.9.4), WP2 only
- Block the →T← key to prevent use of the two functions described above (1.9.10)
- Calibrate first; then adjust automatically (1.10.1) (not available on verified instruments)
- Calibrate, then prompt for manual input of adjustment command (1.10.2)
- Calibration prompt: flashing ΔΔ symbol (1.15.2). If more than one weighing instrument is connected, the instrument number is also displayed.
- Block external calibration/adjustment (1.16.2)
- Display altitude and geographical latitude or acceleration of gravity after CAL is shown at the beginning of the calibration procedure (menu item 8.12.2). These values are shown only if they have been entered in the service menu and activated.
  For each of these parameters, the term is displayed first (ALt itud, LAt itud or GrAU itY) for 1 second, and then the corresponding value is displayed continuously until you press →T←.

Note
On verified weighing instruments, the external calibration/adjustment function is available only when the menu access switch is in the "open" position, which entails breaking the verification seal (refer to the chapter entitled "Service"). The equipment must be re-verified after the seal has been broken.

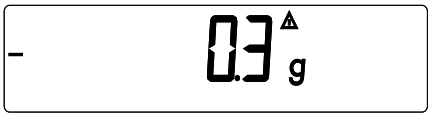
Example
External calibration and manual adjustment with default weights

Setup menu settings:
1.9.1; 1.10.2

→0←	Unload and zero the weighing instrument
→T← > 2 sec	Start calibration (e.g., when calibration prompt is flashing: ΔΔ)
CAL	The following is displayed for 2 seconds
- 10000.0 g	You are prompted to place the required weight on the weighing instrument (e.g., 10 kg)



Position the calibration weight on the weighing instrument



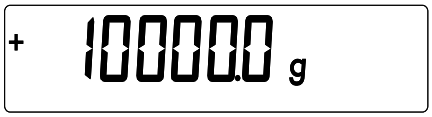
The difference between the weight value and the true mass is displayed, with ± sign.

```
External calibration
Nom.  +    10000.0 g
Diff. -        0.3 g
--------------------
```

Calibration record is printed, if adjustment was not performed and the process was stopped by pressing →0←



Activate calibration/adjustment manually (press the →0← key to cancel)

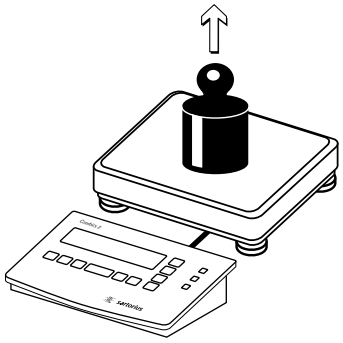


The calibration weight is displayed at the conclusion of calibration

```
--------------------
14.01.2002     13:00
Model           CISL2
Ser.no.      12345678
Vers.     1.1007.12.1
BVers.       01-25-01
--------------------
External calibration
Nom.  +  10000.0 g
Diff. -      0.3 g
External adjustment
Diff. +      0.0 g
--------------------
14.01.2002     13:02
Name:

--------------------
```

A GMP-compliant printout is generated



Unload the weighing instrument

Counting

With the Counting application, you can determine the number of parts that each have approximately equal weight.

Features:

- Store the weight on the weighing instrument as reference weight
- Enter reference weight using a bar code scanner
- Enter tare weight using a bar code scanner
- Automatic reference sample updating (user-definable)
- Counting with two weighing instruments
- Toggle the display between piece count and weight by pressing [⇆]
- Info mode for display of average piece weight and reference sample quantity by pressing [⇆] (> 2 sec)

Before the quantity on the weighing instrument can be calculated, the average piece weight must be entered in the application. There are 2 ways to do this with the Combics:

- By placing the number of parts defined as the reference sample quantity on the weighing instrument and pressing [OK] to store the average piece weight.

  The reference sample quantity is shown in the numeric display, and can be changed by pressing [REF].

  How the reference weight is calculated depends on the menu setting for resolution (3.9). Either the value is rounded off in accordance with the display resolution, or the display resolution is increased 10-fold (+1 decimal place) or 100-fold (+ 2 decimal places), or maximum internal resolution is applied.

- By entering the reference piece weight (i.e., the weight of one piece) using a bar code scanner (menu setting: "Setup> Bar code > Store value as reference (rEF)"). In this case, the value is stored as a reference automatically, without pressing the [OK] key.

  This value remains active in the reference memory until you delete it by pressing [CF], overwrite it or until you select a different application. It also remains in memory when you switch to a different application program, or switch off the Combics.

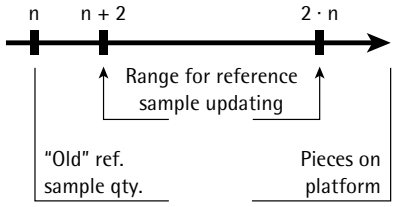
Application Parameters: Counting

- 3. 5. Minimum Load for Automatic Taring and Automatic Printing
  - 3. 5. 1 * 1 digit
  - 3. 5. 2 2 digits
  - 3. 5. 3 5 digits
  - 3. 5. 4 10 digits
  - 3. 5. 5 20 digits
  - 3. 5. 6 50 digits
  - 3. 5. 7 100 digits
  - 3. 5. 8 200 digits
  - 3. 5. 9 500 digits
  - 3. 5.10 1000 digits
- 3. 6. Minimum Load for Initialization
  - 3. 6. 1 * 1 digit
  - 3. 6. 2 2 digits
  - 3. 6. 3 5 digits
  - 3. 6. 4 10 digits
  - 3. 6. 5 20 digits
  - 3. 6. 6 50 digits
  - 3. 6. 7 100 digits
  - 3. 6. 8 200 digits
  - 3. 6. 9 500 digits
  - 3. 6.10 1000 digits
- 3. 7. Automatic Taring: 1st Weight Tared
  - 3. 7. 1 * Off
  - 3. 7. 2 On
- 3. 8. Start Application with Most Recent Application Data when Combics is Switched On
  - 3. 8. 1 Automatic (on)
  - 3. 8. 2 * Manual (off)
- 3. 9. Resolution for Calculation of Reference Value
  - 3. 9. 1 * Display resolution
  - 3. 9. 2 Display resolution + 1 decimal place
  - 3. 9. 3 Display resolution + 2 decimal places
  - 3. 9. 4 Internal resolution
- 3.11 Storage Parameter
  - 3.11. 1* At stability
  - 3.11. 2 At increased stability
- 3.12. Reference Sample Updating
  - 3.12. 1 Off
  - 3.12. 3* Automatic
- 3.13. Reference Weighing Instrument
  - 3.13. 1* No reference instrument selected
  - 3.13. 2 WP1
  - 3.13. 3 WP2

Storage Parameter
The reference weight is saved when the weighing instrument has stabilized. "Stability" is defined as the point at which fluctuation of a measured value lies within a defined tolerance range. The narrower the tolerance range, the more stable the weighing instrument is at "stability." This setting is also applied when you zero the weighing instrument.
Under menu item 3.11 you can determine whether the value is saved "At stability" (normal tolerance range) or "At increased stability" (narrower tolerance range).
If you select "At increased stability," the average piece weight stored will be more accurate and the results more reproducible, but the response time of the weighing instrument might be longer.

Minimum Load for Initialization
The minimum load for initialization is configured under menu item 3.6. If the load exceeds this limit, the weighing instrument can be initialized. If the load is too light, the following will occur when you try to save a value:
- The error code InF 29 is displayed
- A warning signal is emitted (double-beep)
- The weighing instrument is not initialized
- The preset reference sample quantity is stored

Reference Sample Updating
In the Application settings under 3.12, you can define whether the reference sample is updated automatically. Reference sample updating is performed automatically only when the following 6 criteria are met:
1. Menu item 3.12.3 is active
2. The current piece exceeds the original piece count by at least two
3. The current piece count is less than twice the original piece count (does not apply for the first update if the piece count is entered using a bar code scanner).



4. The current piece count is less than 100.
5. The internally calculated piece count (such as 17.24 pcs) differs by less than ± 0.3 pcs from the whole number (17 pcs in this example).
6. The weighing instrument is stable in accordance with the defined stability parameter.

When automatic reference sample updating is active, the AUTO symbol is displayed in addition to the Counting symbol (⁂). When the reference sample has been updated, *OPT* is displayed below *AUTO*. During an updating operation, OPt and the updated piece count are displayed briefly in the main display.

At the conclusion of reference sample updating, a beep is sounded and the new reference weight and reference sample quantity are stored. Activate the "Info" mode to view the reference values (press and hold [⇆] > 2 sec).

Counting with Two Weighing Instruments
You can use two weighing instruments simultaneously with the Counting application. When using two instruments, you can choose from the following operating modes:
- Counting with two equivalent weighing instruments
- Counting with one reference weighing instrument and one counting platform

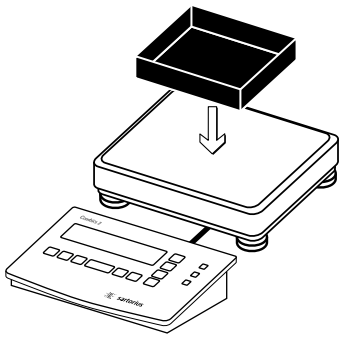
Counting with Two Equivalent Weighing Instruments
Use this mode when samples of widely varying weight are counted at one workstation. Count the lighter-weight pieces on one weighing instrument and the heavier pieces on another. When you press [⚖] to toggle from one weighing instrument to the other, the application is re-initialized.
You can define which of the two weighing instruments is active in the display when the Combics is switched on (menu item 8.11). This is the first weighing instrument active when you switch on the Combics, regardless of the setting for automatic initialization of the Counting application.

Counting with One Reference Weighing Instrument and One Counting Platform
In this mode, a high-resolution weighing instrument with a relatively low maximum capacity is used as a reference weighing instrument. The weighing platform is used for weighing heavier samples, and has a high capacity with a relatively low resolution.
This way, you can both determine the reference sample quantity very precisely and count large amounts of parts, without requiring an expensive high-resolution, high-capacity weighing platform.
Specify which weighing instrument is the reference instrument under menu item 3.13. The system toggles automatically to the reference weighing instrument for initialization (rEF is displayed). Following initialization, the system toggles to the counting platform.

The system does not toggle automatically for automatic reference sample updating; the update is based on whichever instrument is active.

Example:





Place empty container on the weighing instrument

→T←

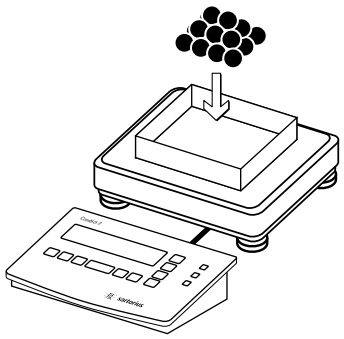
Tare the weighing instrument



REF (repeatedly, if necessary)

Set the desired reference sample quantity (in this example, 20)



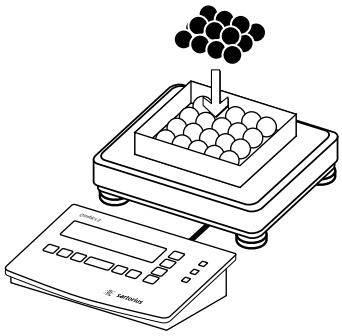


Place the corresponding number of pieces (20) in the container

OK

Confirm reference sample weight





Add more parts to the container (in this example, 18 pcs)

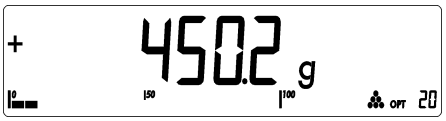




OPt is displayed if automatic reference sample updating is enabled

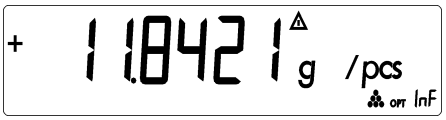


Toggle the display from piece count to weight



 < 2 sec.

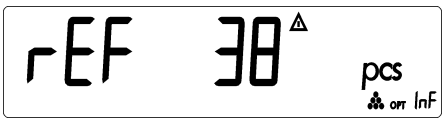
Toggle to Info mode



Piece count is displayed



Toggle to the next display mode



Reference sample quantity is displayed

 (> 2 sec)

Return to weighing mode



Print results

```
G#     +     610.0 g
T      +     200.0 g
N      +     410.0 g

Qnt              38 pcs
--------------------
```

Neutral Measurement ⁂ ⊓⊓

When the Neutral Measurement application is selected, you can use your weighing instrument to measure the length, surface and volume of parts that have roughly the same specific weight. The *o* symbol is displayed as the weight unit.

Features:

- Store the weight on the weighing instrument as reference weight
- Enter reference weight using a bar code scanner
- Enter tare weight using a bar code scanner
- Toggle the display between weight and calculated value by pressing ⇆
- Info mode for display of reference weight by pressing ⇆ (> 2 sec)

To calculate the result correctly, the average weight of a reference quantity must be known (in the example below, the reference is 1 meter of electrical cable). There are 2 ways to do this with the Combics:

- By placing the number of parts defined for the reference value on the weighing instrument and pressing OK to store the average piece weight.

  The reference value is shown in the numeric display, and can be changed by pressing REF.

  How the reference weight is calculated depends on the menu setting for resolution (3.9). Either the value is rounded off in accordance with the display resolution, or the display resolution is increased 10-fold (+1 decimal place) or 100-fold (+ 2 decimal places), or maximum internal resolution is applied.

- By entering the reference weight (i.e., the weight of one piece) using a bar code scanner (menu setting: “Setup> Bar code > Store value as reference (rEF)”). In this case, the value is stored as a reference automatically, without pressing the OK key.

  This value remains active in the reference memory until you delete it by pressing CF, overwrite it or until you select a different application. It also remains stored after you switch off the Combics.

Application Parameters: Neutral Measurement

- 3. 5. Minimum Load for Automatic Taring and Automatic Printing
  - 3. 5. 1 * 1 digit
  - 3. 5. 2 2 digits
  - 3. 5. 3 5 digits
  - 3. 5. 4 10 digits
  - 3. 5. 5 20 digits
  - 3. 5. 6 50 digits
  - 3. 5. 7 100 digits
  - 3. 5. 8 200 digits
  - 3. 5. 9 500 digits
  - 3. 5.10 1000 digits
- 3. 6. Minimum Load for Initialization
  - 3. 6. 1 * 1 digit
  - 3. 6. 2 2 digits
  - 3. 6. 3 5 digits
  - 3. 6. 4 10 digits
  - 3. 6. 5 20 digits
  - 3. 6. 6 50 digits
  - 3. 6. 7 100 digits
  - 3. 6. 8 200 digits
  - 3. 6. 9 500 digits
  - 3. 6.10 1000 digits
- 3. 7. Automatic Taring:1st Weight Tared
  - 3. 7. 1 * Off
  - 3. 7. 2 On
- 3. 8. Start Application with Most Recent Application Data when Combics is Switched On
  - 3. 8. 1 Automatic (on)
  - 3. 8. 2 * Manual (off)
- 3. 9. Resolution for Calculation of Reference Value
  - 3. 9. 1 * Display resolution
  - 3. 9. 2 Display resolution + 1 decimal place
  - 3. 9. 3 Display resolution + 2 decimal places
  - 3. 9. 4 Internal resolution
- 3.10. Decimal Places for Display of Results
  - 3.10. 1 * None
  - 3.10. 2 1 decimal place
  - 3.10. 3 2 decimal places
  - 3.10. 4 3 decimal places
- 3.11. Storage Parameter
  - 3.11. 1* At stability
  - 3.11. 2 At increased stability
- 3.13. Reference Weighing Instrument
  - 3.13. 1* Off
  - 3.13. 2 WP1
  - 3.13. 3 WP2

Storage Parameter
The reference weight is saved when the weighing instrument has stabilized. "Stability" is defined as the point at which fluctuation of a measured value lies within a defined tolerance range. The narrower the tolerance range, the more stable the weighing instrument is at "stability." This setting is also applied when you zero the weighing instrument.
Under menu item 3.11 you can determine whether the value is saved "At stability" (normal tolerance range) or "At increased stability" (narrower tolerance range).
If you select "At increased stability," the average piece weight stored will be more accurate and the results more reproducible, but the response time of the weighing instrument might be longer.

Decimal Places for Display of Results
In neutral measurement, not only whole numbers but also decimal numbers (for example, 1.25 o electrical cabling) can be displayed. The number of decimal places displayed in neutral measurement is configured under menu item 3.10. The measured result can be displayed with 0, 1, 2 or 3 decimal places.

Minimum Load for Initialization
The minimum load for initialization is configured under menu item 3.6. If the load exceeds this limit, the weighing instrument can be initialized. If the load is too light, the following will occur when you try to save a value:
- The error code inF 29 is displayed
- A warning signal is emitted (double-beep)
- The weighing instrument is not initialized
- The preset reference value is stored

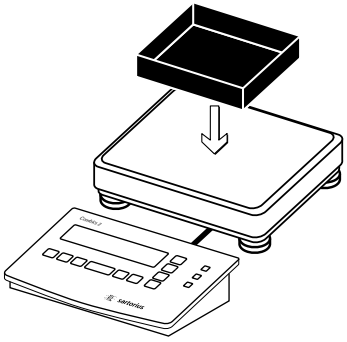
Neutral Measurement with Two Weighing Instruments
You can use two weighing instruments simultaneously with the Neutral Measurement application. When using two instruments, you can choose from the following operating modes:
- Neutral measurement with two equivalent weighing instruments
- Neutral measurement with one reference weighing instrument and one measurement platform

Neutral Measurement with Two Equivalent Weighing Instruments
Use this mode when samples of widely varying weight are measured at one workstation. Measure the lighter-weight pieces on one weighing instrument and the heavier pieces on another. When you press ⚖ to toggle from one weighing instrument to the other, the application is re-initialized.
You can define which of the two weighing instruments is active in the display when the Combics is switched on (menu item 8.11). This is the first weighing instrument active when you switch on the Combics, regardless of the setting for automatic initialization of the Neutral Measurement application.

Neutral Measurement with One Reference Weighing Instrument and One Measuring Platform
In this mode, a high-resolution weighing instrument with a relatively low maximum capacity is used as a reference weighing instrument. The measuring platform has a high capacity, but a relatively low resolution.
This allows you to both determine the reference value with high resolution; i.e., very precisely, and to measure large samples, without requiring an expensive high-resolution, high-capacity weighing platform.
Specify which weighing instrument is the reference instrument under menu item 3.13. The system toggles automatically to the reference instrument for initialization (rEF is shown in the main display). Following initialization, the system toggles to the measuring platform.

Example:
Determine the length of an amount of electrical cable after weighing in the defined reference unit value

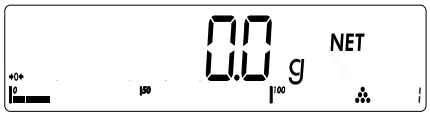




Place empty container on the weighing instrument

→T←

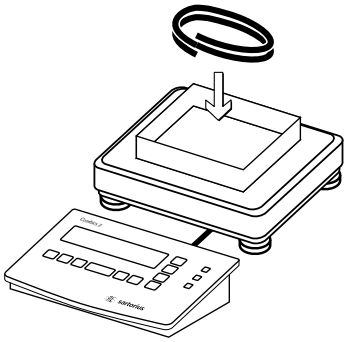
Tare the weighing instrument



REF (repeatedly, if necessary)

Set the desired reference value (in this example, 2)



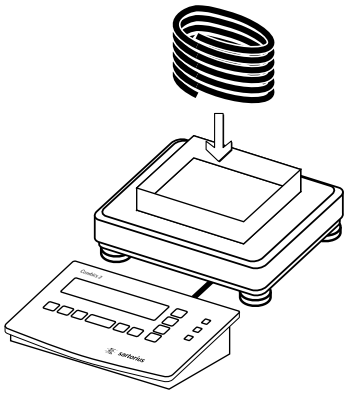


Place a sample corresponding to the reference quantity in the container
(in this example, 2 meters of electrical cable)

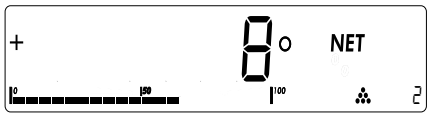
OK

Confirm reference sample weight





Remove the reference material and place the sample to be measured on the weighing instrument (in this example, 8 meters of electrical cable



Print results

```
G#     +     734.1 g
T      +     200.0 g
N      +     534.1 g

Qnt                8 o
---------------------
```

Checkweighing ±

When the Checkweighing application is selected, you can check whether sample weights correspond to a specified target weight; i.e., whether the weight on the weighing instrument is within a given tolerance range. The tolerance range is defined by upper and lower limits. The result is displayed in the main indicator, in the bar graph and by color-coded LEDs.

Features:

- The target value can be taken over as a weighed value from a weighing instrument, and the tolerance limits are defined as a perceptual deviation from the target value. The following percentages can be selected as the deviation: 0.1%, 0.2%, 0.5%, 1%, 1.5%, 2%, 3%, 5% or 10%.
- The target value, lower tolerance limit (minimum) and upper tolerance limit (maximum) can be taken over as weighed values from the weighing instrument.
- Target and tolerance limits checked during input; values must conform to: Upper limit ≥ Target ≥ Lower limit ≥ 1 digit
- Checkweighing range: either 30% to 170% of the target, or from 10% to infinity
- Application started automatically with most recent application data when Combics switched on
- Automatic taring
- Automatic printing
- Toggle the display between weight and tolerances limits by pressing [⇆]. When tolerances are displayed, weights exceeding the tolerance limits are shown with "LL" (too low) or "HH" (too high).
- Digital input/output interface
- Info mode for display of tolerance limits by pressing [⇆] (> 2 sec)

Checkweighing entails comparing the current weight value to a defined target. The target value has a tolerance range which can be entered either as an absolute value or percentage (menu item 4.5).

- Entering the tolerance range as an absolute value (weighed value) (menu item 4.5.1):
  Start initialization by pressing [OK]; the middle segments of the bar graph flash to prompt the placement of the weight on the weighing instrument. Place the weight on the instrument and press [OK] to store.
  The bar graph segment for the lower limit flashes to prompt the weight for lower limit. Place the weight on the weighing instrument and press [OK] to store.
  The bar graph segment for the upper limit flashes to prompt the weight for upper limit. Place the weight on the weighing instrument and press [OK] to store.

- Entering the tolerance range as a percentage (menu item 4.5.2):
  A value for the percentage is shown in the numeric display (lower right-hand corner) together with the "%" sign. Press [REF] to change the percentage value (0.1%, 0.2%, 0.5%, 1%, 1.5%, 2%, 3%, 5%, 10%).
  Start initialization by pressing [OK]; the middle segments of the bar graph flash to prompt the placement of the weight on the weighing instrument. Place the weight on the instrument and press [OK] to store. To can change the percentage value for the tolerance limits again before the target value is stored, press [REF].

  Before the new initialization, the previous initialization values must be deleted by pressing [CF].

Application Parameters: Checkweighing

- 3. 5. Minimum Load for Automatic Taring and Automatic Printing
  - 3. 5. 1 * 1 digit
  - 3. 5. 2 2 digits
  - 3. 5. 3 5 digits
  - 3. 5. 4 10 digits
  - 3. 5. 5 20 digits
  - 3. 5. 6 50 digits
  - 3. 5. 7 100 digits
  - 3. 5. 8 200 digits
  - 3. 5. 9 500 digits
  - 3. 5.10 1000 digits
- 3. 7. Automatic Taring: 1st Weight Tared
  - 3. 7. 1 * Off
  - 3. 7. 2 On
- 3. 8. Start Application with Most Recent Application Data when Combics is Switched On
  - 3. 8. 1 Automatic (on)
  - 3. 8. 2 * Manual (off)
- 4. 2. Checkweighing Range
  - 4. 2. 1 * 30% to 170%
  - 4. 2. 2 10% to infinity
- 4. 3. Activate Control Line for "Set" as:
  - 4. 3. 1 * "Set" output
  - 4. 3. 2 Ready to operate
- 4. 4. Activation of Outputs
  - 4. 4. 1 Off
  - 4. 4. 2 Always active
  - 4. 4. 3 Active at stability
  - 4. 4. 4 * Active within checkweighing range
  - 4. 4. 5 Active at stability within the checkweighing range
- 4. 5. Parameter Input
  - 4. 5. 1 * Min, max, target
  - 4. 5. 2 Only target with percent limits
- 4. 6. Automatic Printing
  - 4. 6. 1 * Off
  - 4. 6. 2 On
  - 4. 6. 3 Only values within tolerance
  - 4. 6. 4 Only values outside tolerance

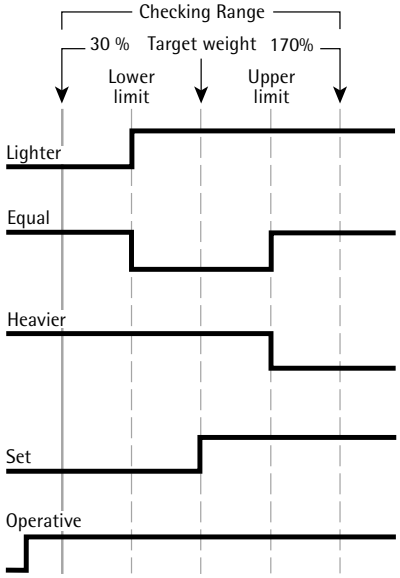
Display
The result of a measurement is shown either as a weight value or in relation to the target. You can toggle between these two display modes by pressing ⇆.

- Weight display mode:
  The main display always shows the weight value, even if the value is outside the tolerance range.
  The bar graph is displayed with symbols indicating lower limit, target and upper limit. It shows a logarithmic display of the current load if the weight is anywhere from 0 to the minimum load, and a linear display for weights beyond that range.
  The LEDs indicate the following:
  Yellow: weight value > upper tolerance limit
  Green: weight value is within tolerance
  Red: weight value < lower tolerance limit
  If no LED lights up:
  - the application is not completely initialized, or
  - the weight value is outside the checkweighing range (see menu item 4.2)
  - the weighing instrument has not stabilized
- Tolerance limit display mode:
  As "Weight display mode" above, with the exception that:
  - LL is shown on the main display if the weight value is lower than the target, and
  - HH is shown on the main display if the weight value is higher than the target

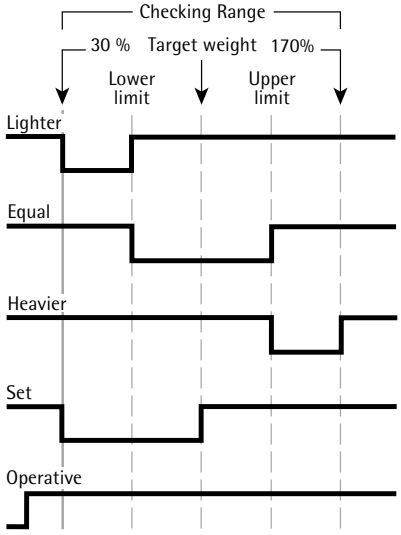
Digital Input/Output Interface
The Checkweighing application supports the digital input/output interface.
There are 4 control lines, or outputs, which are activated as follows (also refer to the diagram):
- Lighter
- Equal
- Heavier
- Set
  The "SET" output normally changes its voltage level when the load is near the target weight. Alternatively, you can assign the "Ready-for-use" function to this port (menu item 4.3.2).

  Under menu item 4.4, you can define whether these control ports are
- inactive (4.4.1)
- always active (4.4.2)
- active at stability (4.4.3)
- active within the check range, or
- active at stability within the check range
  For example, you can use this function to show the weighed or measured result on a simple external indicator, similar to the 3 LEDs on the Combics 2.

  All data output ports have a high voltage level when:
- the application has not been initialized,
- the weighing instrument is not at stability and one of the "at stability..." parameters, (4.4.3 or 4.4.5) is selected, or
- the weight is not within the check range (4.4.4).



Digital I/O Interface
"SET" control line: set and control lines: Always active/Active at stability



Digital I/O Interface
"SET" control line: set and control lines: active within checkweighing range/ Active within checkweighing range at stability

Output line specifications:
- In the inactive state, the levels are set to "high:" >3.7 V/+4 mA
- In the active state, the levels are set to "low:" <0.4 V/–4 mA

⚠ The output lines are not short-circuit proof!

Example:
Initialize the Checkweighing application by taking over the weighed value as target; select percentage to define tolerance range (menu item 4.5.2)

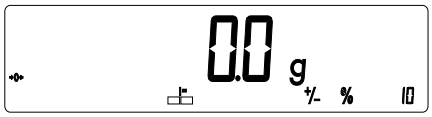
CF

Delete any existing initialization data

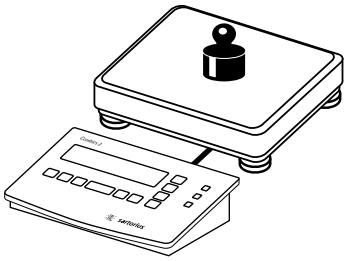


OK

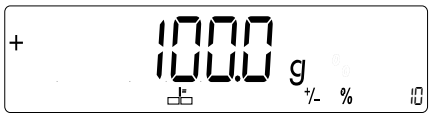
Begin initialization



The middle segments of the bar graph flash to prompt the placement of the weight on the weighing instrument



Place the weight for the target on the weighing instrument (in this example, 100.0 g)



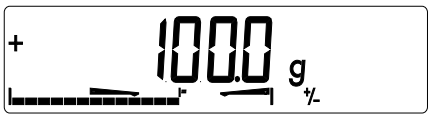
REF repeatedly, if necessary

Select the desired percentage for tolerance limits (in this example, 5%)



OK

Store target and calculate tolerance range based on the selected percentage



Optional: ⟲ < 2 sec.

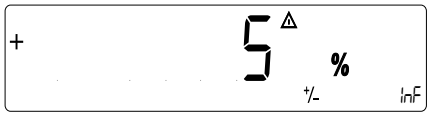
Toggle to Info mode to view stored values



Target value is displayed

Optional: 

Toggle to the next display mode



Percentage for limits is displayed

Optional: 

Toggle to the next display mode



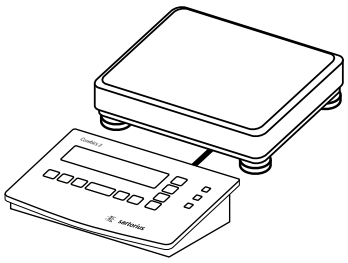
Weight value for the lower limit (minimum) is displayed

Optional: 

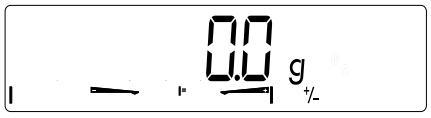
Toggle to next display mode (weight value for the upper limit is displayed)

Optional:  > 2 sec

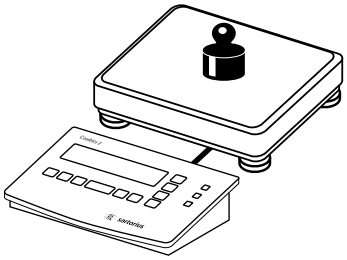
Exit the Info mode



Unload weighing instrument



Example:
Check the weight of a sample; use Tolerance Limit display mode



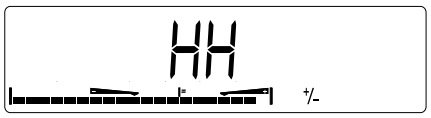
Place a load of unknown weight on the weighing instrument



If the weight is under the lower tolerance limit, LL is shown in the tolerance limit display (load is too light) (the weight display shows the measured weight value)



If the weight is within the tolerance range (in this example, 103.2 g), the weight value is displayed



If the weight is over the upper tolerance limit, HH is shown in the tolerance limit display (load is too heavy) (the weight display shows the measured weight value)



Print results

Printout

```
     ACE HARDWARE
      GOETTINGEN
19.03.2002      15:43
--------------------
Setp   +     100.0 g      Target value
Min    +      95.0 g      Minimum
Max    +     105.0 g      Maximum

G#     +     103.2 g      Gross weight
T      +       0.0 g      Tare weight
N      +     103.2 g      Net weight

Lim    +      3.20 %      Percentage of deviation from target*
W.Diff+       3.2 g      Absolute difference from target
--------------------
```

* In Tolerance Limit display mode:
If the weight is lighter than the target, the display shows: `Stat  LL`
If the weight is heavier than the target, the display shows: `Stat  HH`

Classification +/– CL

With the Classification application, you can determine whether the weight of a given sample lies within the limits of a defined weight class.

Features:

- Configure 3 or 5 classes (menu item 4.8)
- Define contiguous classes
- Define classes that cover the entire weighing range of the weighing instrument
- Range below the specified minimum load is designated "Class 0"
- Define the upper limit of a given class by storing weight on weighing instrument or by entering a weight value and a percentage
- Show the current weight in the main display as a weight value or as belonging to a certain class
- Class of current weight also indicated by 1 LED (when using 3 classes) or 2 LEDs (when using 5 classes) 2 LEDs (when using 5 classes)
- Toggle the display between weight and class by pressing [⇆].
- Digital input/output interface
- Info mode for display of class limits by pressing [⇆] (> 2 sec)

To use the Classification application, you need to enter the delimiters that separate one class from another.

- Start the initialization by pressing [OK]. The lower limit of Class 1 is defined by the preset minimum load. Weight values below minimum load are classified as belonging to Class 0, in part to prevent an unloaded weighing instrument from displaying a value that designates a class.

  You can enter the other class delimiters as absolute values or percentages (menu item 4.9).

- Entering the class delimiters as absolute values (weighed values) (menu item 4.9.1):
  For each upper limit (except that of the highest class), place a load on the weighing instrument and press [OK] to store it as the upper limit of a class. The bar graph and the numeric display show the limit currently being configured.
  Each time you store a value for an upper limit, a check is run to make sure the value is equal to or greater than the upper limit of the previous class. If the value is invalid, an acoustic signal is emitted; the limit must be entered again.

- Entering delimiters as percentages (menu item 4.9.2):
  Define the upper limit of Class 1 by placing the corresponding weight on the weighing instrument and pressing [OK]. The value is equal to 100 %.
  The upper limit of Class 2 is equal to 100 % plus the percentage you select by pressing [REF] (1, 2, 5, 10, 15, 30, 50, 70, 100, 150, 199 %).
  Example: A load of 100 g is stored from the weighing instrument as the upper limit of Class 1. The value 15% is then entered, defining the upper limit of Class 2 as 115 g.
  In this case, the weight ranges when working with 5 classes are:
  Class 0: up to the minimum load
  Class 1: Minimum load – 100 g
  Class 2: 100 g – 115 g
  Class 3: 115 g – 130 g
  Class 4: 130 g – 145 g
  Class 5: 145 g – maximum capacity

  Before a new initialization, the previous initialization values must be deleted by pressing [CF].

Application Parameters: Classification

- 3. 5. Minimum Load for Automatic Taring and Automatic Printing
  - 3. 5. 1 * 1 digit
  - 3. 5. 2 2 digits
  - 3. 5. 3 5 digits
  - 3. 5. 4 10 digits
  - 3. 5. 5 20 digits
  - 3. 5. 6 50 digits
  - 3. 5. 7 100 digits
  - 3. 5. 8 200 digits
  - 3. 5. 9 500 digits
  - 3. 5.10 1000 digits
- 3. 6. Minimum Load for Initialization and Defining the Class 1 Lower Limit
  - 3. 6. 1 * 1 digit
  - 3. 6. 2 2 digits
  - 3. 6. 3 5 digits
  - 3. 6. 4 10 digits
  - 3. 6. 5 20 digits
  - 3. 6. 6 50 digits
  - 3. 6. 7 100 digits
  - 3. 6. 8 200 digits
  - 3. 6. 9 500 digits
  - 3. 6.10 1000 digits
- 3. 7. Automatic Taring: 1st Weight Tared
  - 3. 7. 1 * Off
  - 3. 7. 2 On
- 3. 8. Start Application with Most Recent Application Data when Combics is Switched On
  - 3. 8. 1 Automatic (on)
  - 3. 8. 2 * Manual (off)
- 4. 3. Activate Control Line for "Set" as:
  - 4. 3. 1 * "Set" output
  - 4. 3. 2 Ready to operate (for process control systems)
- 4. 7. Activation of Outputs
  - 4. 7. 1 Off
  - 4. 7. 2 Always active
  - 4. 7. 3 * Active at stability
- 4. 8. Number of Classes
  - 4. 8. 1 * 3 classes
  - 4. 8. 2 5 classes
- 4. 9. Parameter Input
  - 4. 9. 1 * Weight values
  - 4. 9. 2 Percentage
- 4.10. Automatic Printing
  - 4.10. 1* Off
  - 4.10. 2 On

Minimum Load for Initialization and Defining the Class 1 Lower Limit
The minimum load defines the lower limit for Class 1 (i.e., the delimiter between Classes 0 and 1). The application can only be initialized (to define the upper limit of Class 1) when the load on the weighing instrument exceeds the minimum load.

Display
The result of a given measurement is shown as either a weight value or the class number. You can toggle between these two display modes by pressing [⇆].

- Weight display; 3 classes:
  The current weight is shown in the display; for example: 108.7 g
  Class 1 Bar graph:
  Numeric display: 1
  LED: red is lit
  Class 2 Bar graph:
  Numeric display: 2
  LED: green is lit
  Class 3 Bar graph:
  Numeric display: 3
  LED: yellow is lit

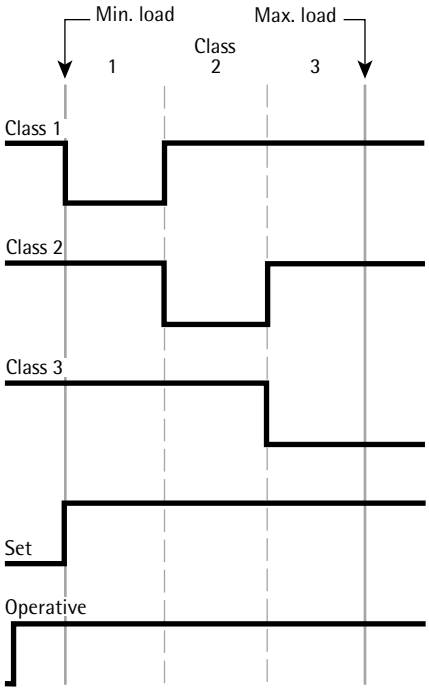
- Weight display; 5 classes
  The current weight is shown in the display; for example: 108.7 g
  Class 1 Bar graph:
  Numeric display: 1
  LED: red is lit
  Class 2 Bar graph:
  Numeric display: 2
  LED: red and green are lit
  Class 3 Bar graph:
  Numeric display: 3
  LED: green is lit
  Class 4 Bar graph:
  Numeric display: 4
  LED: green and yellow are lit
  Class 5 Bar graph:
  Numeric display: 5
  LED: yellow is lit

- Class display; 3 classes
  The current class is shown in the display; for example: CLASS 1 and the bar graph indicates the current weight. The LEDs are lit as for the weight display described above.

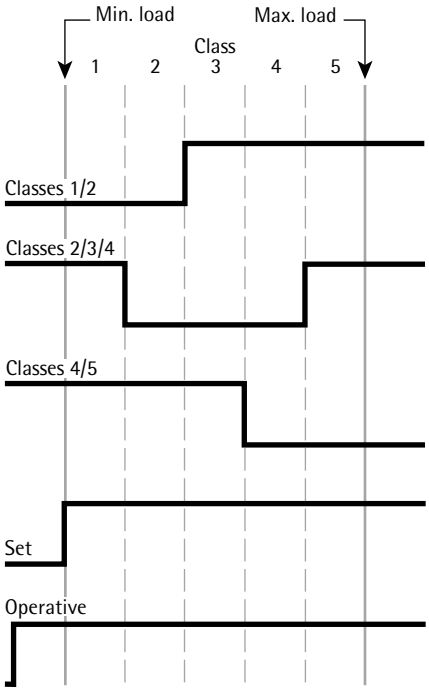
- Class display; 5 classes
  The current class is shown in the display; for example: CLASS 1, and the bar graph indicates the current weight. The LEDs are lit as for the weight display described above.

Digital Input/Output Interface
The Classification application supports the digital input/output-interface. There are 4 control lines, or outputs, which are activated as follows (also refer to the diagram):
- Lighter
- Equal
- Heavier
- Set
  The "Set" line usually indicates that the minimum load is exceeded. Alternatively, you can assign the "Ready-for-use" function to this port.

  Under menu item 4.7, you can define whether these control ports are
- inactive (4.7.1),
- always active (4.7.2), or
- active at stability (4.7.3).
  This makes it possible, for example, to connect a simple indicator for weighing or calculation results, similar to the 3-segment checkweighing display on the Combics, or control an automatic process.



Digital I/O Interface
Control lines when working with 3 classes



Digital I/O Interface
Control lines when working with 5 classes

Example:
Initialize the Classification application by taking over weighed values (menu item 4.9.1) to define 3 classes (menu item 4.81.)

CF

Delete any existing initialization data

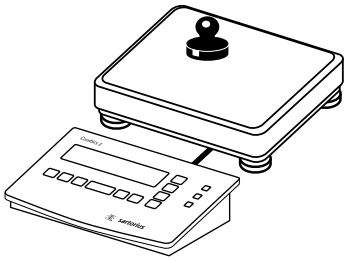


OK

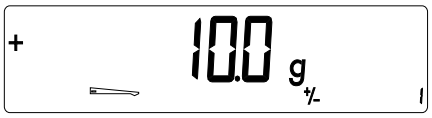
Begin initialization



The minus sign of the bar graph flashes to prompt the weight for the upper limit of the first class. A “1” is shown in the numeric display.

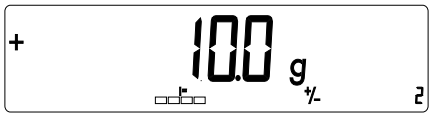


Place the weight for the upper limit of the first class on the weighing instrument (in this example, 10.0 g)

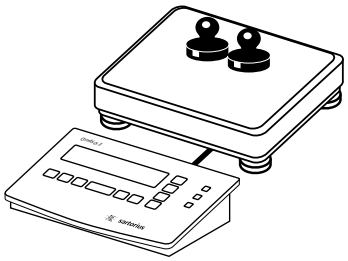


OK

Store the weight value as the upper limit for the first class



The middle segments of the bar graph flash to prompt the placement of the weight for the upper limit of the second class on the weighing instrument. A “2” is shown in the numeric display.

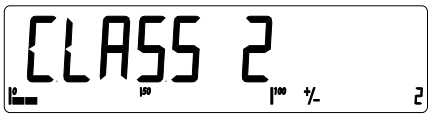


Place the weight for the upper limit of the second class on the weighing instrument (in this example, 20.0 g)



OK

Store the weight value as the upper limit for the second class



When initialization is complete, the display shows the class to which the weight on the weighing instrument belongs.

Optional: < 2 sec.

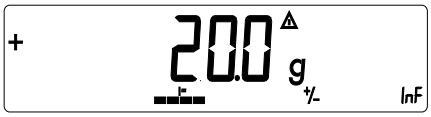
Toggle to Info mode to view stored values



Upper limit of Class 1 is displayed

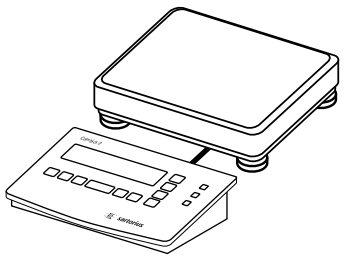
Optional:

Toggle to the next display mode



Upper limit of Class 2 is displayed

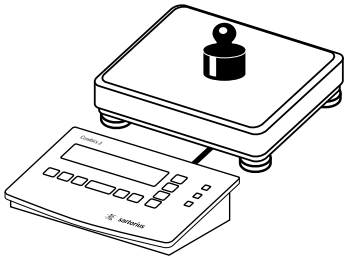
Exit the Info mode



Unload weighing instrument



Example:
Determine the class of a given weight



Place a load of unknown weight on the weighing instrument



The display shows which class the weight falls into; in this example, Class 2 (10 g – 20 g)



Toggle display to weight readout



The weight of the load is shown (in this example, 17.3 g)



Print results

Printout

```
      PET STORE
      GOETTINGEN
05.03.2002      09:43
--------------------
Lim1   +      10.0 g      Upper limit, Class 1
Lim2   +      20.0 g      Upper limit, Class 2

G#     +      17.3 g      Gross weight
T      +       0.0 g      Tare weight
N      +      17.3 g      Net weight

Class       2              Weight class
--------------------
```

Weighing in Percent %

With the Weighing in Percent application, you can use your weighing instrument to obtain weight readouts in percent which are in proportion to a reference weight. The **%** symbol is displayed as the weight unit.

Features:

- Store the weight on the weighing instrument as reference weight
- Enter reference weight using a bar code scanner
- Enter tare weight using a bar code scanner
- Toggle the display between percentage and weight by pressing ⇆
- Show percentage as loss or residue
- Display up to 3 decimal places
- Info mode for display of reference weight by pressing ⇆ (> 2 sec)

To determine the weight of a sample relative to a reference weight, you must enter the reference weight in the weighing instrument. There are 2 ways to do this with the Combics:

- By placing the amount of reference material on the weighing instrument specified by the reference percentage and pressing OK to calculate the average and store the value.

  The reference percentage is shown in the numeric display, and can be changed by pressing REF.

  How the reference weight is calculated depends on the menu setting for resolution (3.9). Either the value is rounded off in accordance with the display resolution, or the display resolution is increased 10-fold (+1 decimal place) or 100-fold (+2 decimal places), or maximum internal resolution is applied.

- By entering the reference weight (i.e., the weight of 100%) using a bar code scanner (menu setting: “Setup> Bar code > Store value as reference (rEF)”). In this case, the value is stored as a reference automatically, without pressing the OK key.

  This value remains active in the reference memory until you delete it by pressing CF, overwrite it or until you select a different application. It also remains stored after you switch off the Combics.

Application Parameters: Weighing in Percent

- 3. 5. Minimum Load for Automatic Taring and Automatic Printing
  - 3. 5. 1 * 1 digit
  - 3. 5. 2 2 digits
  - 3. 5. 3 5 digits
  - 3. 5. 4 10 digits
  - 3. 5. 5 20 digits
  - 3. 5. 6 50 digits
  - 3. 5. 7 100 digits
  - 3. 5. 8 200 digits
  - 3. 5. 9 500 digits
  - 3. 5.10 1000 digits
- 3. 6. Minimum Load for Initialization
  - 3. 6. 1 * 1 digit
  - 3. 6. 2 2 digits
  - 3. 6. 3 5 digits
  - 3. 6. 4 10 digits
  - 3. 6. 5 20 digits
  - 3. 6. 6 50 digits
  - 3. 6. 7 100 digits
  - 3. 6. 8 200 digits
  - 3. 6. 9 500 digits
  - 3. 6.10 1000 digits
- 3. 7. Automatic Taring: 1st Weight Tared
  - 3. 7. 1 * Off
  - 3. 7. 2 On
- 3. 8. Start Application with Most Recent Application Data when Combics is Switched On
  - 3. 8. 1 Automatic (on)
  - 3. 8. 2 * Manual (off)
- 3. 9. Resolution for Calculation of Reference Value
  - 3. 9. 1 * Display resolution
  - 3. 9. 2 Display resolution +1 decimal place
  - 3. 9. 3 Display resolution +2 decimal places
  - 3. 9. 4 Internal resolution
- 3.10. Decimal Places for Display of Results
  - 3.10. 1* None
  - 3.10. 2 1 decimal place
  - 3.10. 3 2 decimal places
  - 3.10. 4 3 decimal places
- 3.11 Storage Parameter
  - 3.11. 1* At stability
  - 3.11. 2 At increased stability
- 3.13. Reference Weighing Instrument
  - 3.13. 1* No reference instrument selected
  - 3.13. 2 WP1
  - 3.13. 3 WP2
- 3.15. Display of calculated value
  - 3.15. 1* Residue
  - 3.15. 2 Loss

Storage Parameter
The reference weight is saved when the weighing instrument has stabilized. "Stability" is defined as the point at which fluctuation of a measured value lies within a defined tolerance range. The narrower the tolerance range, the more stable the weighing instrument is at stability. This setting is also applied when you zero the weighing instrument.
Under menu item 3.11 you can determine whether the value is saved "At stability" (normal tolerance range) or "At increased stability" (narrower tolerance range).
If you select "At increased stability," the reference weight stored will be more accurate and the results more reproducible, but the response time of the weighing instrument might be longer.

Minimum Load for Initialization
The minimum load for initialization is configured under menu item 3.6. If the load exceeds this limit, the weighing instrument can be initialized. If the load is too light, the following will occur when you try to save a value:
- The error code inF 29 is displayed
- A warning signal is emitted (double-beep)
- The weighing instrument is not initialized
- The preset reference percentage is stored

Weighing in Percent with Two Weighing Instruments
You can use two weighing instruments simultaneously with the Weighing in Percent application. When using two instruments, you can choose from the following operating modes:
- Weighing in Percent with two equivalent weighing instruments
- Weighing in Percent with one reference weighing instrument and one weighing platform

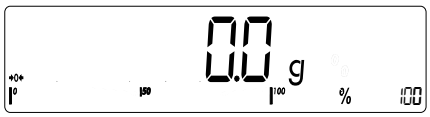
Weighing in Percent with Two Equivalent Weighing Instruments
Use this mode when samples of widely varying weight are measured at one workstation. Measure the lighter-weight pieces on one weighing instrument and the heavier pieces on another. When you press ⚖ to toggle from one weighing instrument to the other, the application is re-initialized.
You can define which of the two weighing instruments is active in the display when the Combics is switched on (menu item 8.11). This is the first weighing instrument active when you switch on the Combics, regardless of the setting for automatic initialization of the Weighing in Percent application.

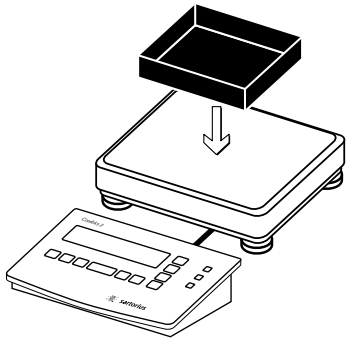
Weighing in Percent with One Reference Weighing Instrument and One Weighing Platform
In this mode, a high resolution weighing instrument with a relatively low maximum capacity is used as a reference weighing instrument. The measuring platform has a high capacity, but a relatively low resolution.
This allows you to both determine the reference value with high resolution; i.e., very precisely, and to measure large samples, without requiring an expensive high-resolution, high-capacity weighing platform.
Specify which weighing instrument is the reference instrument under menu item 3.13. The system toggles automatically to the reference instrument for initialization (rEF is shown in the main display). Following initialization, the system toggles to the measuring platform.

Display
With the Weighing in Percent application, the result can be displayed as a remainder or loss. This is configured in Setup under menu item 3.15.

Equations:
Residue= Current weight/ 100% weight* 100
Loss= (Current weight – 100% weight) / 100% weight * 100

Example:





Place empty container on the weighing instrument

→T←

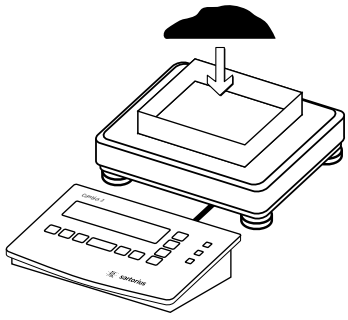
Tare the weighing instrument



REF (repeatedly, if necessary)

Set the desired percentage (in this example, 50%)



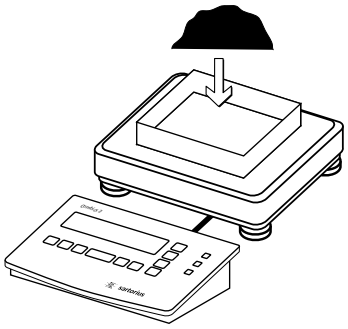


Place reference material corresponding to the reference percentage in the container

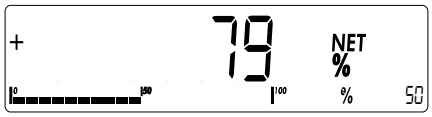
OK

Confirm the reference weight





Remove the reference material and place the sample to be measured on the weighing instrument



The percentage of the reference weight equal to the sample is displayed



Print results

```
G#     +    641.2 g
T      +    200.0 g
N      +    441.2 g

Prc    +    21.00 %
--------------------
```

Residue

```
G#     +    641.2 g
T      +    200.0 g
N      +    441.2 g

D      -    79.00 %
--------------------
```

Loss

Averaging (Animal Weighing)

With the Averaging application, you can use your weighing instrument for calculating weights as the average of a number of individual weighing operations. These individual operations are also known as "subweighing operations."
This function is used to determine weights under unstable ambient conditions or for weighing unstable samples (such as live animals).

Features:

- Averaging started manually or automatically
- Press the REF key to select the desired number of subweighing operations
- Toggle the display between last result and current weight by pressing ⇆

A number of subweighing operations are required to form the basis for calculation of an average weight. These are performed consecutively as soon as the weight of one sample differs from that of the previous sample by less than the preset deviation.

The value for this deviation is entered in the Application settings (3.19) as a percentage. This value and the minimum load must be reached to start the averaging routine.

Whether averaging starts automatically or manually is defined under menu item 3.18.

There are four modes for calculating average weights:

- Manual start with preset number of subweighing operations
  To use this mode, place the sample or animal on the weighing instrument and press OK.

- Manual start with the number of subweighing operations entered manually
  To use this mode, place the sample/animal on the weighing instrument, press REF to enter the number of subweighing operations (10, 20, 30, 40) and then press OK.

- Automatic start with preset number of subweighing operations
  The subweighing operations begin when the weight of the sample/animal on the weighing instrument exceeds the minimum load.

- Automatic start with the number of subweighing operations entered manually
  To use this mode, press REF and enter the number of subweighing operations before placing the sample or animal on the weighing instrument. The subweighing operations begin when the weight of the sample/animal on the weighing instrument exceeds the minimum load.

  If the "automatic tare" function is configured, the weight of the first load is stored as the tare value, and averaging begins only when the second load is placed on the weighing instrument (provided this weight exceeds the preset minimum load).

Minimum Load for Automatic Start
The minimum load for automatic start is configured under menu item 3.6.
If the load exceeds this limit, the averaging routine can begin.

Display
A calculated average value is shown continuously on the main display.
The symbol ⚠ is displayed.
Press ⇆ to toggle the display between this result and the current weight value.

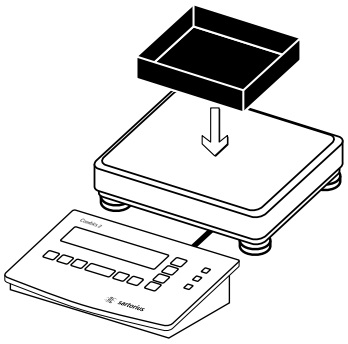
If the menu setting "Display is static until unload threshold reached" (3.21.1) is active, the program returns to the weight display automatically when the weighing instrument is unloaded; i.e., when the load is less than half the minimum load. The result of the most recent averaging operation is not stored.
If the menu setting "Display is static until CF is pressed" (3.21.2) is active, the average weight remains on the weight display after the weighing instrument is unloaded, until the CF key is pressed or until a new measurement series is started, whether manually or automatically.

Application Parameters: Averaging (Animal Weighing)

- 3. 5. Minimum Load for Automatic Taring and Automatic Printing
  - 3. 5. 1 * 1 digit
  - 3. 5. 2 2 digits
  - 3. 5. 3 5 digits
  - 3. 5. 4 10 digits
  - 3. 5. 5 20 digits
  - 3. 5. 6 50 digits
  - 3. 5. 7 100 digits
  - 3. 5. 8 200 digits
  - 3. 5. 9 500 digits
  - 3. 5.10 1000 digits
- 3. 6. Minimum Load
  - 3. 6. 1 * 1 digit
  - 3. 6. 2 2 digits
  - 3. 6. 3 5 digits
  - 3. 6. 4 10 digits
  - 3. 6. 5 20 digits
  - 3. 6. 6 50 digits
  - 3. 6. 7 100 digits
  - 3. 6. 8 200 digits
  - 3. 6. 9 500 digits
  - 3. 6.10 1000 digits
- 3. 7. Automatic Taring: 1st Weight Tared
  - 3. 7. 1 * Off
  - 3. 7. 2 On
- 3. 8. Start Application with Most Recent Application Data when Combics is Switched On
  - 3. 8. 1 Automatic (on)
  - 3. 8. 2 * Manual (off)
- 3.18. Start of Averaging Routine
  - 3.18. 1* Manual
  - 3.18. 2 Automatic
- 3.19. Animal Activity
  - 3.19. 1 0.1 % of the animal/object
  - 3.19. 2* 0.2% of the animal/object
  - 3.19. 3 0.5 % of the animal/object
  - 3.19. 4 1% of the animal/object
  - 3.19. 5 2% of the animal/object
  - 3.19. 6 5% of the animal/object
  - 3.19. 7 10% of the animal/object
  - 3.19. 8 20% of the animal/object
  - 3.19. 9 50% of the animal/object
  - 3.19.10 100 % of the animal/object
- 3.20. Automatic Printout of Results
  - 3.20. 1* Off
  - 3.20. 2 On
- 3.21. Static Display After Load Removed
  - 3.21. 1* Display is static until unload threshold reached
  - 3.21. 2 Display is static until CF is pressed

Example:

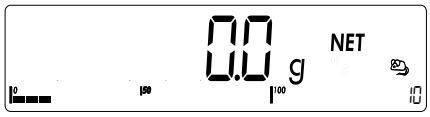




Place empty container on the weighing instrument

→T←

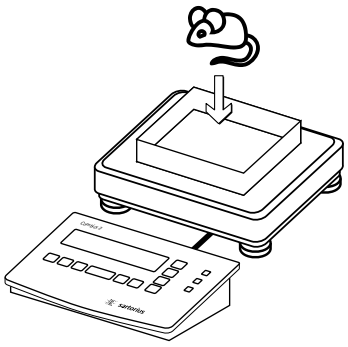
Tare the weighing instrument



REF (repeatedly, if necessary)

Set the desired number of measurements (in this example, 20)





Place 1st animal in bowl

OK

Start measurement



Measurement starts as soon as all criteria are met. The number of subweighing operations remaining is shown in the numeric display.

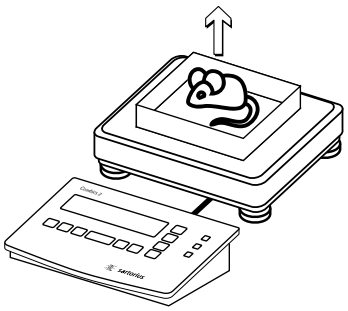


At the conclusion of the series, the calculated mean value is displayed with the ⚠ symbol.



Print results

```
x-Net +    24.6 g
```



Unload weighing instrument



Once the weighing instrument is unloaded
(i.e., the load = less than 1/2 the minimum load), the current weight value is displayed.

Net-Total Formulation

When the Net-Total Formulation application is selected, you can weigh in different components up to a defined total. Each component is saved in the net-total memory.
You can print out both the total weight and the individual weights of the components.

Features:

- Weigh in up to 199 components in series
- Current component number shown in the numeric display (indicating the component to be added)
- Toggle the display between "component mode" and "additive mode" by pressing [⇆]:
  - Component mode: Display the weight of the component currently on the instrument (for 1 second after it is saved; then the instrument is tared)
  - Additive mode: Display the weight of all components on the instrument (after it is saved, the net weight of the last component added is displayed briefly)
- Toggle to a second weighing instrument while weighing on the first
- Automatic printout of component or total weight when weight is saved
- Automatic taring of container weight
- Minimum load for automatic taring
- Minimum load for storing values
- Display the value in totalizing memory in the Info mode, accurately calculated in the active weight unit, by pressing and holding [⇆]

Application Parameters: Net-Total Formulation

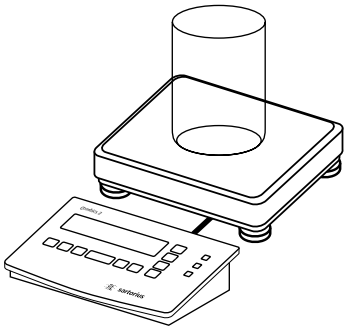
- 3. 5. Minimum Load for Automatic Taring and Automatic Printing
  - 3. 5. 1 * 1 digit
  - 3. 5. 2 2 digits
  - 3. 5. 3 5 digits
  - 3. 5. 4 10 digits
  - 3. 5. 5 20 digits
  - 3. 5. 6 50 digits
  - 3. 5. 7 100 digits
  - 3. 5. 8 200 digits
  - 3. 5. 9 500 digits
  - 3. 5.10 1000 digits
- 3. 6. Minimum Load for Automatic Storage/Transfer of Values
  - 3. 6. 1 * 1 digit
  - 3. 6. 2 2 digits
  - 3. 6. 3 5 digits
  - 3. 6. 4 10 digits
  - 3. 6. 5 20 digits
  - 3. 6. 6 50 digits
  - 3. 6. 7 100 digits
  - 3. 6. 8 200 digits
  - 3. 6. 9 500 digits
  - 3. 6.10 1000 digits
- 3. 7. Automatic Taring: 1st Weight Tared
  - 3. 7. 1 * Off
  - 3. 7. 2 On
- 3.17. Automatic Individual or Component Printout when Value Stored
  - 3.17. 1 Off
  - 3.17. 2* Generate printout with complete standard configuration each time [OK] is pressed
  - 3.17. 3 Generate printout with complete standard configuration only once when [OK] is pressed

Minimum Load for Automatic Storage/ Transfer of Values
The minimum load for automatic storage or transfer of weight values is configured under menu item 3.6.
If the load exceeds this limit, the weight currently displayed can be stored in net-total memory.

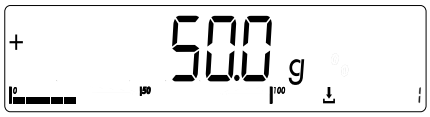
Net-Total Formulation with Two Weighing Instruments
This mode is used for weighing large and small components at the same time.
In this mode, you can toggle from the small-component instrument to the large-component instrument during measurement. Once you toggle to the large-component instrument, the [→0←] and [→T←] keys are available until a component is value is saved.
For example, you can tare a partially-filled container taken from the small-component instrument on the large component instrument.
The value in component memory on the small-component instrument is transferred to the large-component instrument and the weight unit is converted, if necessary. The Component and Additive display modes are both available on the large-component instrument.
The value read by the active instrument is saved in component memory. The displayed result is accurately calculated in the active weight unit, for example:
1243 g
(from an instrument with 1 interval)
\+ 1.40 kg
(from an instrument with 5 intervals)
= 2.643 kg (calculated result)

When you press [CF] to stop a measurement series, the tare memories for both weighing instruments are cleared, unless the large-component instrument is in SBI mode, in which case the instrument is only tared.

Example:
Weigh in 3 components, display total weight after 2nd component (Additive mode)



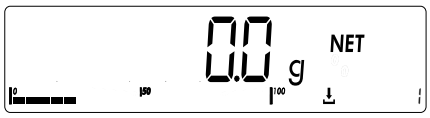
Place empty container on the weighing instrument

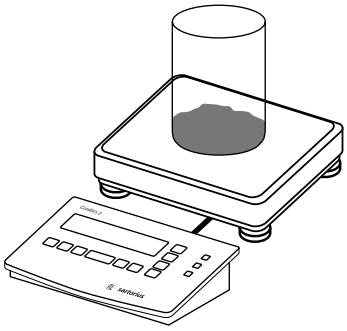


Container weight a prompt for first component are shown

→T←

Tare the weighing instrument





Add the first component (in this example, 68.3 g)



The weight of the first component is displayed

OK

Store the weight of the first component

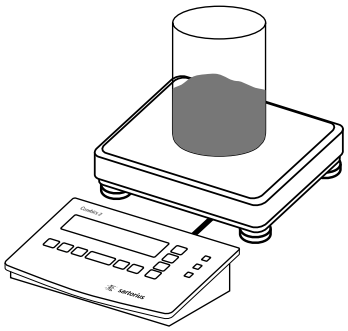
```
    ACE HARDWARE
     GOETTINGEN
20.02.2002      15:10
--------------------
Cmp001        68.3 g
```

Total data record is printed, as configured under menu item 7.7. or 7.8.
The header is printed only once

Component weight



The weighing instrument is tared automatically and the component counter value is increased by one (prompting the next component)



Add the second component (in this example, 82.7 g)



The weight of the second component is displayed

OK

Store the weight of the second component

```
Cmp002        82.7 g
```

Component weight is printed



The weighing instrument is tared automatically and the component counter value is increased by one (prompting the next component)

Toggle to the Additive mode



The value displayed equals the weight of all components added up to now plus the current weight



Add the third component (bringing the total to the desired target)

OK

Store the weight of the third component

```
Cmp003        49.1 g
```

Component weight is printed

CF

End the weighing-in operation

Total data record is printed, as configured under 7.9. or 7.10.

```
Ser.no        12345678
n                    3
S-Comp+       200.1 g
Cont.T+        50.0 g
--------------------
```

Serial number of the weighing instrument
Number of components
Content of component memory
Content of tare memory (container weight)
Dotted line

Totalizing Σ

With the Totalizing application, you can add weight values to the totalizing memory. The number of values added to the memory is also stored ("transaction counter").

Features:

- Weigh in up to 199 items
- Current transaction number displayed in the text line (indicating the items already added)
- Save weight values manually or automatically
- Accurate calculation of total of weight values from two weighing instruments
- Unfinished totalization stored in battery-backed memory
- Toggle the display between current weight and total value by pressing ⇆:
  - Totalizing mode: shows the value in totalizing memory plus the current weight; for filling to a defined total
- Automatic printout of component or total weight when weight is saved
- Automatic taring of container weight
- Minimum load for automatic tare
- Minimum load for storing values
- Press and hold ⇆ to display the value in totalizing memory (net, gross) in the Info mode, accurately calculated in the active weight unit.

The Combics has a totalizing memory for adding individual net and gross values. There are two ways to store weight values in the totalizing memory:

- Manually, by pressing the OK key. The value is added to the value already stored, and the transaction counter value increases by one. When a value is added manually, the program does not check whether the weighing instrument has been unloaded since the last time the OK key was pressed.

- Automatically, when the weighing instrument has stabilized and the minimum load is exceeded (menu item 3.16.2). The weighing instrument is considered to be unloaded when the load is less than 50% of the minimum load (menu item 3.6.

The numeric display shows the transaction counter.

Press the CF key to clear the totalizing memory. A printout is generated automatically.

With the weighing instruments connected, you can add values from both instruments to the totalizing memory. The displayed result is accurately calculated in the active weight unit. Example: 1.243 kg (measured on a weighing instrument using 1 scale interval) added to 1.40 kg (measured on a weighing instrument using 5 scale intervals) is displayed as 2.643 kg.

Application Parameters: Totalizing

- 3. 5. Minimum Load for Automatic Taring and Automatic Printing
  - 3. 5. 1 * 1 digit
  - 3. 5. 2 2 digits
  - 3. 5. 3 5 digits
  - 3. 5. 4 10 digits
  - 3. 5. 5 20 digits
  - 3. 5. 6 50 digits
  - 3. 5. 7 100 digits
  - 3. 5. 8 200 digits
  - 3. 5. 9 500 digits
  - 3. 5.10 1000 digits
- 3. 6. Minimum Load for Automatic Storage/ Transfer of Values
  - 3. 6. 1 * 1 digit
  - 3. 6. 2 2 digits
  - 3. 6. 3 5 digits
  - 3. 6. 4 10 digits
  - 3. 6. 5 20 digits
  - 3. 6. 6 50 digits
  - 3. 6. 7 100 digits
  - 3. 6. 8 200 digits
  - 3. 6. 9 500 digits
  - 3. 6.10 1000 digits
- 3. 7. Automatic Taring: 1st Weight Tared
  - 3. 7. 1 * Off
  - 3. 7. 2 On
- 3. 8. Start Application with Most Recent Application Data when Combics is Switched On
  - 3. 8. 1 Automatic (on)
  - 3. 8. 2 * Manual (off)
- 3.16. Automatic Storage/Transfer of Value
  - 3.16. 1* Off
  - 3.16. 2 On
- 3.17. Automatic Individual or Component Printout when Value Stored
  - 3.17. 1 Off
  - 3.17. 2* Generate printout with complete standard configuration each time OK is pressed
  - 3.17. 3 Generate printout with complete standard configuration only once when OK is pressed

Minimum Load for Automatic Storage/Transfer of Values
The minimum load for automatic storage or transfer of weight values is configured under menu item 3.6. Once the load on the weighing instrument exceeds the specified minimum, the measured value is stored or transferred automatically, if the operating menu is configured for automatic storage (menu item 3.16.2).

Display
Press [⇆] to toggle the display between the weight currently on the weighing instrument and the current weight value plus the value in totalizing memory.

Press and hold [⇆] (> 2 sec) to toggle to the Info mode. In the "Info" mode, the total of gross weight values is shown first. Press [⇆] again to show the net value.
Press the [⇆] key again to show the transaction counter in the main display.
Press [⇆] one more time to exit the Info mode.
To exit the "Info" mode earlier, press and hold [⇆] (> 2 sec).

Printout
Under menu item 3.17 you can configure whether a printout is generated manually, by pressing [🖹] (3.17.3), or automatically when a weight value is stored in the totalizing memory (3.17.2 or 3.17.3).

When you generate a printout manually by pressing [🖹], the transaction counter value is not printed.

For automatic printouts, you can define whether a printout is generated after each individual transaction (3.17.2) or includes all totalized components (3.17.3).

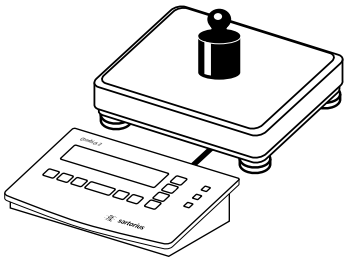
Each printout starts with the header lines and the date and time, followed by a dotted line, before printing the gross, tare, net and transaction counter values.

The printout of components includes the header lines and date and time only on the first printout. Subsequent printouts include only the gross, tare, net and transaction counter values (and serial number, if configured).

The individual and component printouts are configured under menu items 7.7 and 7.8.

The total data record is printed when you clear the totalizing memory (by pressing the [CF] key).
The total data record includes data from the gross totalizing memory (***G**), the net totalizing memory (*** N**), the total transaction count (**n**) and a dotted line.
The fields selected under menu items 7.9. and 7.10. are printed every time the [CF] key is pressed, regardless of whether individual or component printing is configured.

Example:
Totalizing weight values with printout of components



Place the sample on the weighing instrument



Weight value is displayed

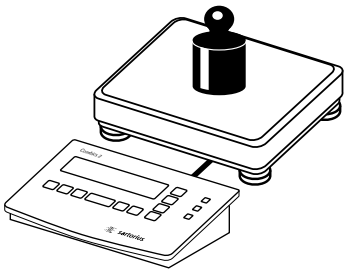
OK

Store weight value in totalizing memory



Main display: Current weight on the weighing instrument
Numeric display: Transaction counter (in this example: 1)

```
    SARTORIUS
    GOETTINGEN
06.02.2002      12:15
--------------------
G#      +     102.9 g
T       +       0.0 g
N       +     102.9 g
n                   1
```



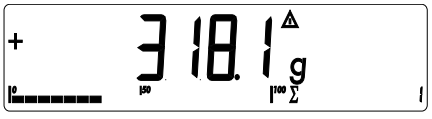
Unload the weighing instrument and then place the second sample on the instrument



Weight value is displayed

Optional:

Toggle to Totalizing mode



Main display: Totalizing memory content plus current weight
Numeric display: Transaction counter (in this example: 1)

OK

Store weight value in totalizing memory

```
      SARTORIUS
      GOETTINGEN
06.02.2002      12:19
--------------------
G#      +     215.2 g
T       +       0.0 g
N       +     215.2 g
n                   2
```



Main display: Totalizing memory content plus current weight
Numeric display: Transaction counter (in this example: 2)

CF

End totalizing

Total data record is printed, as configured under 7.9. or 7.10.

```
*G      +     318.1 g
*N      +     318.1 g
n                   2
--------------------
```

Number of components
Contents of component memory
Contents of tare memory (container weight)
Dotted line

Configuration

Operating Menu Overview

You can configure the Combics to meet individual requirements by entering user data and setting selected parameters in the operating menu.

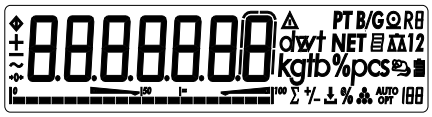
The operating menu is a combination of text levels and numeric codes.

////////// = Setting/function available on Combics 1 plus only
= Setting/function available on Combics 2 only
= Setting/function available on Combics 1 plus and Combics 2 only

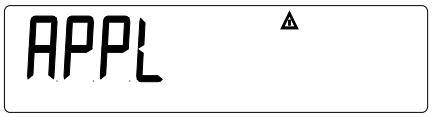
First level display	2nd level display	Function
Menu		
APPL		Select and configure application programs
	⚖	Basic Weighing Function
	⁂	Counting
	⁂ nN	Neutral Measurement
	🐑	Averaging (Animal Weighing)
	+/−	Checkweighing
	+/− CL	Classification
	%	Weighing in Percent
	⬇	Net-Total Formulation
	Σ	Totalizing
Fn-KEY		Define the function of Fn
	oFF	No function
	Gro nEt	Gross/net toggling
	2.un It	Show 2nd weight unit
	rES 10	10-fold increased resolution
SEtuP		Adapt Combics to user requirements
	WP 1	Settings for weighing instrument on WP1
	Con 1	Settings for the RS-232 interface
	un 1Con	Settings for the optional second interface
	CtrL In	Set the function of the universal input (control line)
	bArCodE	Set the bar code scanner function
	PrtPro	Settings for the printout
	ut IL It	Settings for additional functions
	t IME	Set the time
	dAtE	Set the date
	CodE	Enter a password to protect menu settings
InFo		View device-specific information (service date, serial number, etc.)
LAnG		Select language for calibration, adjustment and GMP printouts
	dEutSCH	German
	EnGL ISH	English
	uS ModE	English with U.S. date/time format
	FrAnC	French
	ItAL	Italian
	ESPAnoL	Spanish

Example: Change language from English to English with U.S. date/time format

I/⏻ — Switch on the Combics



→T← — While all segments are lit, press the →T← key

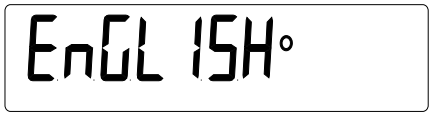


First level of menu for selecting the application program APPL is shown

Fn — Select the LAnG menu item (press Fn repeatedly until LAnG is displayed)



→T← — Select LAnG device parameter



The currently active language is shown

Fn — Select the u.S. ModE menu item

Press Fn repeatedly until u.S. ModE is displayed)

→T← — Confirm this menu item

Return to menu level 2 to configure other menu settings, or

→0← — return to menu level 1 to configure other menu settings, or

→T← > 2 sec — exit the operating menu

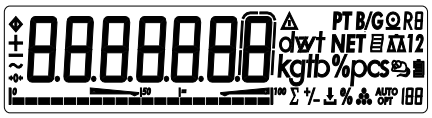


Configuration

Example: Assign a password to protect the application program settings "APPL" and the device parameters "SEtuP" from unauthorized changes (in this example: AB2)

I/⏻

Switch on the Combics



→T←

While all segments are lit, press the →T← key



First level of menu for selecting the application program APPL is shown

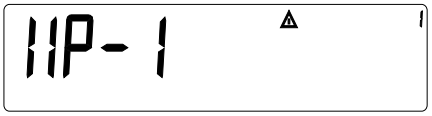
Fn

Select the SEtuP menu item
(press Fn repeatedly until SEtuP is displayed)



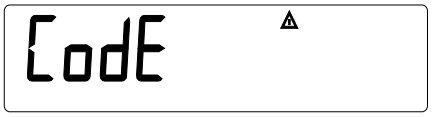
→T←

Open the SEtuP menu



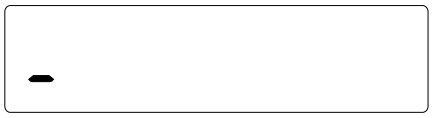
Fn

Select the CodE menu item
(Press Fn repeatedly until CodE is displayed)



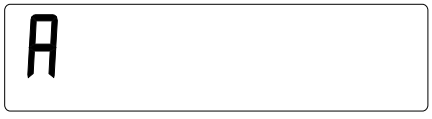
→T←

Open the password input menu item



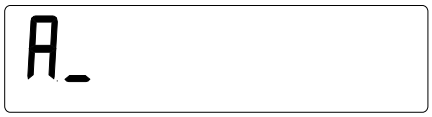
(⊟), (⊟)

Enter the first character using the (⊟) and Fn keys (in this example: A)



→T←

Store character



(⊟), (⊟), (⊟)

Enter the second character using the (⊟) and Fn keys (in this example: b)



→T←

Store character



Fn, Fn, Fn

Enter the third character using the (⊟) and Fn keys (in this example: 2)



→T←

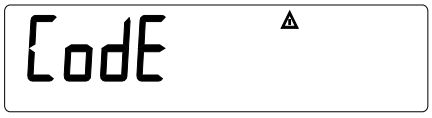
Store character

To enter other characters, use the (⊟) and Fn keys and press →T← to confirm



→T←

Store the password



→0←

Exit this menu level to configure other menu settings, or

→T← > 2 sec

Exit the operating menu



To delete a password:
Overwrite the old password with the new password, or enter a space as the password and press →T← to confirm.

Configuration

Operating Menu Overview (Parameters)

////////// = Setting/function available on Combics 1 plus only
= Setting/function available on Combics 2 only
= Setting/function available on Combics 1 plus and Combics 2 only

* Factory setting

Menu

APPL

Application Programs
Basic Weighing Function

3. 5.	Minimum Load for Automatic Taring and Automatic Printing
3. 5. 1 *	1 digit
3. 5. 2	2 digits
3. 5. 3	5 digits
3. 5. 4	10 digits
3. 5. 5	20 digits
3. 5. 6	50 digits
3. 5. 7	100 digits
3. 5. 8	200 digits
3. 5. 9	500 digits
3. 5.10	1000 digits
3. 7.	Automatic Taring: 1st Weight Tared
3. 7. 1 *	Off
3. 7. 2	On
9. 1.	Factory Settings for All Application Programs
9. 1. 1	Yes
9. 1. 2 *	No

Counting

3. 5.	Minimum Load for Automatic Taring and Automatic Printing
Numeric menu as for Weighing	
3. 6.	Minimum Load for Initialization
3. 6. 1 *	1 digit
3. 6. 2	2 digits
3. 6. 3	5 digits
3. 6. 4	10 digits
3. 6. 5	20 digits
3. 6. 6	50 digits
3. 6. 7	100 digits
3. 6. 8	200 digits
3. 6. 9	500 digits
3. 6.10	1000 digits
3. 7.	Automatic Taring: 1st Weight Tared
3. 7. 1 *	Off
3. 7. 2	On
3. 8.	Start Application with Most Recent Application Data when Combics is Switched On
3. 8. 1	Automatic (on)
3. 8. 2 *	Manual (off)
3. 9.	Resolution for Calculation of Reference Value
3. 9. 1 *	Display resolution
3. 9. 2	Display resolution + 1 decimal place
3. 9. 3	Display resolution + 2 decimal places
3. 9. 4	Internal resolution
3.11.	Storage Parameter
3.11. 1 *	At stability
3.11. 2	At increased stability
3.12.	Reference Sample Updating
3.12. 1	Off
3.12. 3 *	Automatic
3.13.	Reference Weighing Instrument
3.13. 1 *	No reference instrument selected
3.13. 2	WP1
3.13. 3	WP2
9. 1.	Factory Settings for All Application Programs
9. 1. 1	Yes
9. 1. 2 *	No

- APPL
  - nn — Neutral Measurement
    - 3. 5. — Minimum Load for Automatic Taring and Automatic Printing
      - Numeric menu as for Weighing
    - 3. 6. — Minimum Load for Initialization
      - Numeric menu as for Counting
    - 3. 7. — Automatic Taring: 1st Weight Tared
      - 3. 7. 1 * — Off
      - 3. 7. 2 — On
    - 3. 8. — Start Application with Most Recent Application Data when Combics is Switched On
      - 3. 8. 1 — Automatic (on)
      - 3. 8. 2 * — Manual (off)
    - 3. 9. — Resolution for Calculation of Reference Value
      - 3. 9. 1 * — Display resolution
      - 3. 9. 2 — Display resolution + 1 decimal place
      - 3. 9. 3 — Display resolution + 2 decimal places
      - 3. 9. 4 — Internal resolution
    - 3.10. — Decimal Places for Display of Results
      - 3.10. 1 * — None
      - 3.10. 2 — 1 decimal place
      - 3.10. 3 — 2 decimal places
      - 3.10. 4 — 3 decimal places
    - 3.11. — Storage Parameter
      - 3.11. 1 * — At stability
      - 3.11. 2 — At increased stability
    - 3.13. — Reference Weighing Instrument
      - 3.13. 1 * — Off
      - 3.13. 2 — To weighing instrument WP1
      - 3.13. 3 — To weighing instrument WP2
    - 9. 1. — Factory Settings for All Application Programs
      - 9. 1. 1 — Yes
      - 9. 1. 2 * — No
  - **Averaging (Animal Weighing)**
    - 3. 5. — Minimum Load for Automatic Taring and Automatic Printing
      - Numeric menu as for Weighing
    - 3. 6. — Minimum Load for Automatic Start
      - Numeric menu as for Counting
    - 3. 7. — Automatic Taring: 1st Weight Tared
      - 3. 7. 1 * — Off
      - 3. 7. 2 — On
    - 3. 8. — Start Application with Most Recent Application Data when Combics is Switched On
      - 3. 8. 1 — Automatic (on)
      - 3. 8. 2 * — Manual (off)
    - 3.18. — Start of Averaging Routine
      - 3.18. 1 * — Manual
      - 3.18. 2 — Automatic
    - 3.19. — Animal Activity
      - 3.19. 1 — 0.1 % of the animal/object
      - 3.19. 2 * — 0.2% of the animal/object
      - 3.19. 3 — 0.5 % of the animal/object
      - 3.19. 4 — 1% of the animal/object
      - 3.19. 5 — 2% of the animal/object
      - 3.19. 6 — 5% of the animal/object
      - 3.19. 7 — 10% of the animal/object
      - 3.19. 8 — 20% of the animal/object
      - 3.19. 9 — 50% of the animal/object
      - 3.19.10 — 100 % of the animal/object
    - 3.20. — Automatic Printout of Results
      - 3.20. 1 * — Off
      - 3.20. 2 — On

APPL

- 3.21. — Static Display After Load Removed
  - 3.21. 1 * — Display is static until unload threshold reached
  - 3.21. 2 — Display is static until CF is pressed
- 9. 1. — Factory Settings for All Application Programs
  - 9. 1. 1 — Yes
  - 9. 1. 2 * — No

Checkweighing

- 3. 5. — Minimum Load for Automatic Taring and Automatic Printing
  - Numeric menu as for Weighing
- 3. 7. — Automatic Taring: 1st Weight Tared
  - 3. 7. 1 * — Off
  - 3. 7. 2 — On
- 3. 8. — Start Application with Most Recent Application Data when Combics is Switched On
  - 3. 8. 1 — Automatic (on)
  - 3. 8. 2 * — Manual (off)
- 4. 2. — Check Range
  - 4. 2. 1 * — 30% to 170%
  - 4. 2. 2 — 10% to infinity
- 4. 3. — Activate Control Line for “Set” as:
  - 4. 3. 1 * — “Set” output
  - 4. 3. 2 — Ready to operate (for process control systems)
- 4. 4. — Activation of Outputs
  - 4. 4. 1 — Off
  - 4. 4. 2 — Always active
  - 4. 4. 3 — Active at stability
  - 4. 4. 4 * — Active within check range
  - 4. 4. 5 — Active at stability within the check range
- 4. 5. — Parameter Input
  - 4. 5. 1 * — Min, max, target
  - 4. 5. 2 — Only target with percent limits
- 4. 6. — Automatic Printing
  - 4. 6. 1 * — Off
  - 4. 6. 2 — On
  - 4. 6. 3 — Only values within tolerance
  - 4. 6. 4 — Only values outside tolerance
- 9. 1. — Factory Settings for All Application Programs
  - 9. 1. 1 — Yes
  - 9. 1. 2 * — No

Classification

- 3. 5. — Minimum Load for Automatic Taring and Automatic Printing
  - Numeric menu as for weighing
- 3. 6. — Minimum Load for Initialization and Definition of “Class 1” Lower Limit
  - Numeric menu as for Counting
- 3. 7. — Automatic Taring: 1st Weight Tared
  - 3. 7. 1 * — Off
  - 3. 7. 2 — On
- 3. 8. — Start Application with Most Recent Application Data when Combics is Switched On
  - 3. 8. 1 — Automatic (on)
  - 3. 8. 2 * — Manual (off)
- 4. 3. — Activate Control Line for “Set” as:
  - 4. 3. 1 * — “Set” output
  - 4. 3. 2 — Ready to operate
- 4. 7. — Activation of Outputs
  - 4. 7. 1 — Off
  - 4. 7. 2 — Always active
  - 4. 7. 3 * — Active at stability

- APPL
  - +/- CL
    - 4. 8. — Number of Classes
      - 4. 8. 1 * — 3 classes
      - 4. 8. 2 — 5 classes
    - 4. 9. — Parameter Input
      - 4. 9. 1 * — Weight values
      - 4. 9. 2 — Percentage
    - 4.10. — Automatic Printing
      - 4.10. 1 * — Off
      - 4.10. 2 — On
    - 9. 1. — Factory Settings for All Application Programs
      - 9. 1. 1 — Yes
      - 9. 1. 2 * — No
  - %

    Weighing in Percent
    - 3. 5. — Minimum Load Automatic Taring and Automatic Printing
      - Numeric menu as for Weighing
    - 3. 6. — Minimum Load for Automatic Initialization
      - Numeric menu as for Counting
    - 3. 7. — Automatic Taring: 1st Weight Tared
      - 3. 7. 1 * — Off
      - 3. 7. 2 — On
    - 3. 8. — Start Application with Most Recent Application Data when Combics is Switched On
      - 3. 8. 1 — Automatic (on)
      - 3. 8. 2 * — Manual (off)
    - 3. 9. — Resolution for Calculation of Reference Value
      - 3. 9. 1 * — Display resolution
      - 3. 9. 2 — Display resolution + 1 decimal place
      - 3. 9. 3 — Display resolution + 2 decimal places
      - 3. 9. 4 — Internal resolution
    - 3.10. — Decimal Places for Display of Results
      - 3.10. 1 * — None
      - 3.10. 2 — 1 decimal place
      - 3.10. 3 — 2 decimal places
      - 3.10. 4 — 3 decimal places
    - 3.11. — Storage Parameter
      - 3.11. 1 * — At stability
      - 3.11. 2 — At increased stability
    - 3.13. — Reference Weighing Instrument
      - 3.13. 1 * — Off
      - 3.13. 2 — To weighing instrument WP1
      - 3.13. 3 — To weighing instrument WP2
    - 3.15. — Display of Calculated Value
      - 3.15. 1 * — Residue
      - 3.15. 2 — Loss
    - 9. 1. — Factory Settings for All Application Programs
      - 9. 1. 1 — Yes
      - 9. 1. 2 * — No
  - ⭳

    Net-Total Formulation (2nd Tare Memory)
    - 3. 5. — Minimum Load Automatic Taring and Automatic Printing
      - Numeric menu as for Weighing
    - 3. 6. — Minimum Load for Automatic Storage/Transfer of Values
      - Numeric menu as for Counting
    - 3. 7. — Automatic Taring: 1st Weight Tared
      - 3. 7. 1 * — Off
      - 3. 7. 2 — On

- APPL
  - ⬇
    - 3.17. — Printout when Value is Stored in Totalizing Memory
      - 3.17. 1 — Automatic printout of results: Off
      - 3.17. 2 * — Generate printout with complete standard configuration each time [OK] is pressed
      - 3.17. 3 — Generate printout with complete standard configuration only once when [OK] is pressed
    - 9. 1. — Factory Settings for All Application Programs
      - 9. 1. 1 — Yes
      - 9. 1. 2 * — No
  - Σ — **Totalizing**
    - 3. 5. — Minimum Load Automatic Taring and Automatic Printing
      - Numeric menu as for Weighing
    - 3. 6. — Minimum Load for Automatic Storage/Transfer of Values
      - Numeric menu as for Counting
    - 3. 7. — Automatic Taring: 1st Weight Tared
      - 3. 7. 1 * — Off
      - 3. 7. 2 — On
    - 3. 8. — Start Application with Most Recent Application Data when Combics is Switched On
      - 3. 8. 1 — Automatic (on)
      - 3. 8. 2 * — Manual (off)
    - 3.16. — Automatic Storage
      - 3.16. 1 * — Off
      - 3.16. 2 — On
    - 3.17. — Printout when Value is Stored in Totalizing Memory
      - 3.17. 1 — Automatic printout of results: Off
      - 3.17. 2 * — Individual of transaction by pressing [OK]
      - 3.17. 3 — Print components of transaction by pressing [OK]
    - 9. 1. — Factory Settings for All Application Programs
      - 9. 1. 1 — Yes
      - 9. 1. 2 * — No
- Fn-KEY — **Key Assignment: [Fn]**
  - oFF * — No [Fn] key function
  - Gro nEt — Gross/net toggling
  - 2. un it — Show 2nd unit
  - rES 10 — 10-fold increased resolution. Display: max. 10 seconds

Device Parameters

Password prompt displayed, if a password is configured

Weighing Instrument 1

(Display designation of this menu level: 1)

SEtuP		
1IP-1 1		
oFF		Off
on		On
1. 1.		Adapting Weighing Instrument to Ambient Conditions (Adapt Filter)
1. 1. 1		Very stable conditions
1. 1. 2	*	Stable conditions
1. 1. 3		Unstable conditions
1. 1. 4		Very unstable conditions
1. 2.		Application Filter
1. 2. 1	*	Final readout
1. 2. 2		Filling mode
1. 2. 3		Low filtering
1. 2. 4		Without filtering
1. 3.		Stability Range
1. 3. 1		¼ digit
1. 3. 2		½ digit
1. 3. 3	*	1 digit [1])
1. 3. 4		2 digits [1])
1. 3. 5		4 digits [1])
1. 3. 6		8 digits [1])
1. 4.		Stability delay
1. 4. 1		No delay
1. 4. 2	*	Short delay
1. 4. 3		Average delay
1. 4. 4		Long delay
1. 5.		Taring [1])
1. 5. 1		Without stability
1. 5. 2	*	After stability
1. 6.		Auto Zero
1. 6. 1	*	On
1. 6. 2		Off
1. 7.		Weight Unit 1 [2])
1. 7. 2		Grams /g
1. 7. 3		Kilograms /kg
1. 7. 4		Carats /ct [1])
1. 7. 5		Pounds /lb [1])
1. 7. 6		Ounces /oz [1])
1. 7. 7		Troy ounces /ozt [1])
1. 7. 8		Hong Kong taels /tlh [1])
1. 7. 9		Singapore taels /tls [1])
1. 7.10		Taiwanese taels /tlt [1])
1. 7.11		Grains /GN [1])
1. 7.12		Pennyweights /dwt [1])
1. 7.13		Milligrams /mg [1])
1. 7.14		Parts per pound /lb [1])
1. 7.15		Chinese taels /tlc [1])
1. 7.16		Mommes /mom [1])
1. 7.17		Austrian carats /k [1])
1. 7.18		Tola /tol [1])
1. 7.19		Baht /bat [1])
1. 7.20		Mesghal /MS [1])
1. 7.21		Tons /t
1. 8.		Display Accuracy 1
1. 8. 1	*	All digits
1. 8. 2		Reduced by 1 decimal place for load change
1. 8. 3		Reduced by 1 decimal place [1])
1. 8. 4		Reduced by 2 decimal places [1])
1. 8. 5		Reduced by 3 decimal places [1])

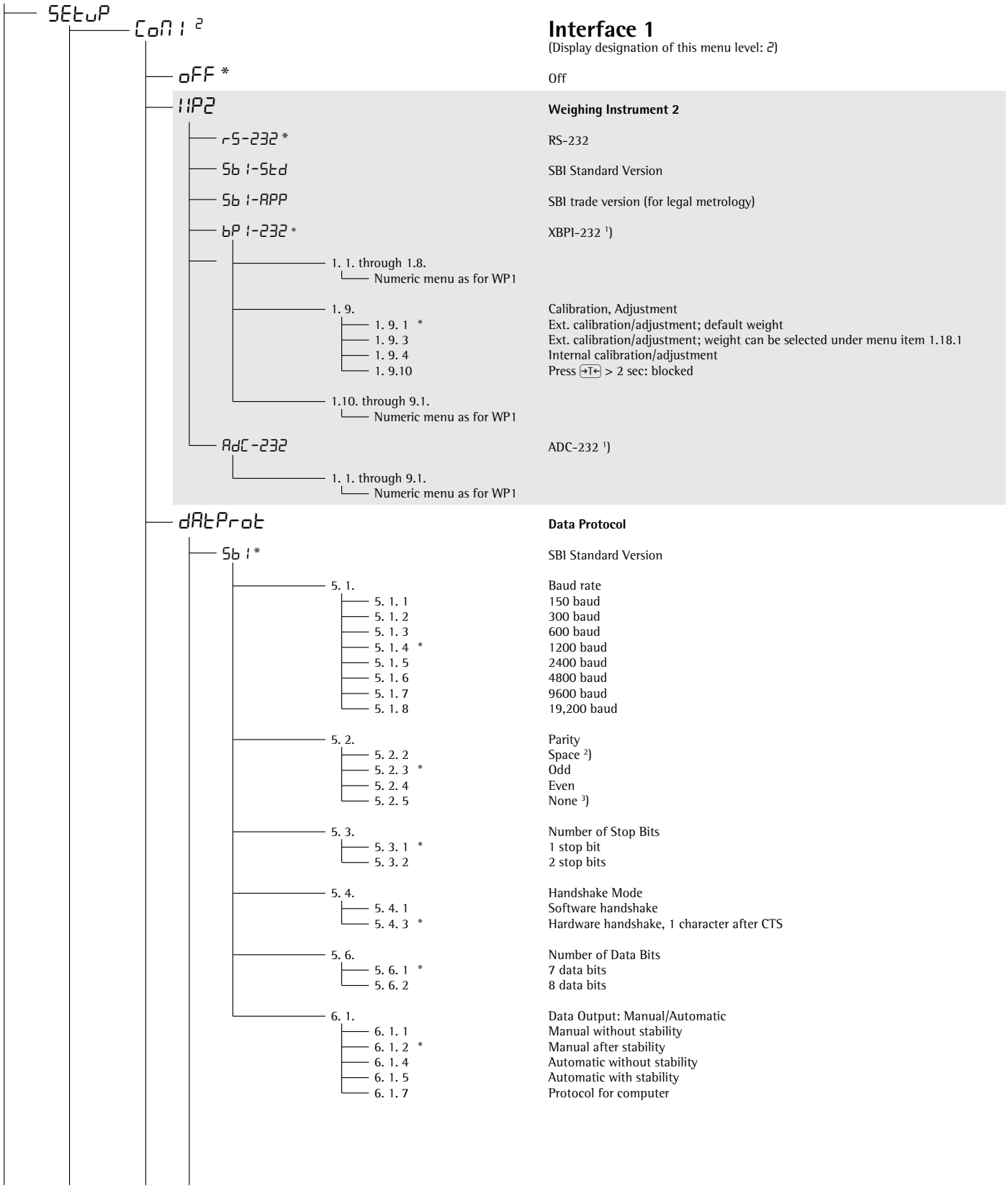
[1]) = Not available on instruments verified for use in legal metrology
[2]) = Depends on weighing instrument model

Configuration

SEtuP
WP-1 [1]
on

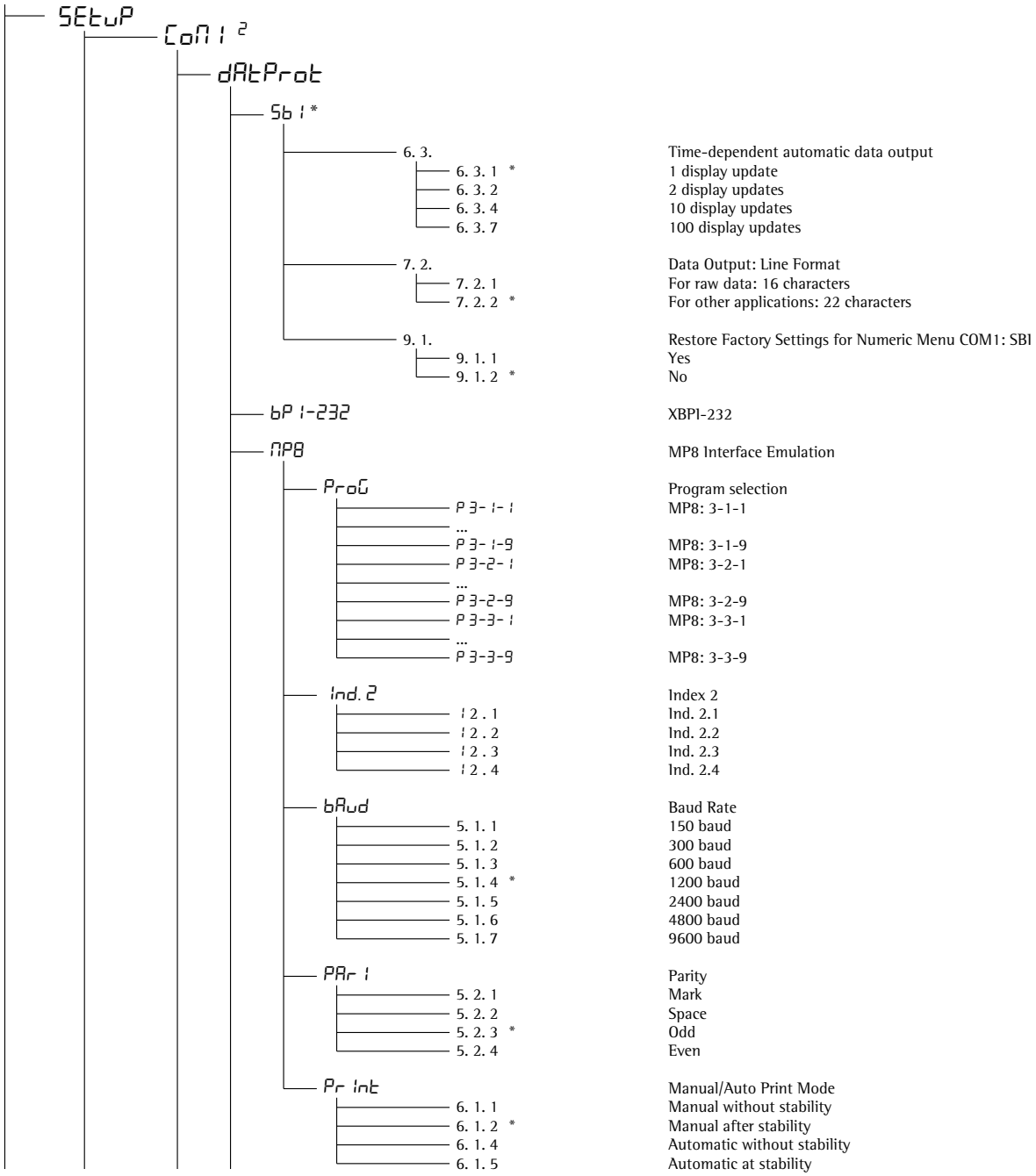
1. 9.		Calibration, Adjustment
1. 9. 1	*	Ext. calibration/adjustment; default weight
1. 9. 3		Ext. calibration/adjustment; weight can be selected under menu item 1.18.1
1. 9.10		Press →T← -> 2 sec: blocked
1.10.		Calibration/adjustment sequence
1.10. 1		Calibration with automatic adjustment
1.10. 2	*	Calibration with adjustment triggered manually
1.11.		Zero-setting Range
1.11. 1		1 percent/max. cap.
1.11. 2	*	2 percent/max.cap.
1.12.		Initial Zero-setting Range
1.12. 2		2 percent/max. cap.
1.12. 3	*	5 percent/max.cap.
1.13.		Tare/Zero at Power On
1.13. 1	*	On
1.13. 2		Off, load previous tare value
1.13. 3		Only zero at power on
1.15.		Calibration Prompt
1.15. 1	*	Off
1.15. 2		Calibration prompt "$\overline{\Delta\Delta}$" flashes in the display
1.16.		External Calibration/Adjustment [1]
1.16. 1	*	Accessible
1.16. 2	[2]	Blocked
1.18.		Enter Calibration Weight
1.18. 1		External user-defined weight; enter value; e.g.: 10.000 kg)
3. 1.		Weight Unit 2 [3]
3. 1. 2		Grams /g
3. 1. 3		Kilograms /kg
3. 1. 4		Carats /ct [1]
3. 1. 5		Pounds /lb [1]
3. 1. 6		Ounces /oz [1]
3. 1. 7		Troy ounces /ozt [1]
3. 1. 8		Hong Kong taels /tlh [1]
3. 1. 9		Singapore taels /tls [1]
3. 1.10		Taiwanese taels /tlt [1]
3. 1.11		Grains /GN [1]
3. 1.12		Pennyweights /dwt [1]
3. 1.13		Milligrams /mg [1]
3. 1.14		Parts per pound /lb [1]
3. 1.15		Chinese taels /tlc [1]
3. 1.16		Mommes /mom [1]
3. 1.17		Austrian carats /k [1]
3. 1.18		Tola /tol [1]
3. 1.19		Baht /bat [1]
3. 1.20		Mesghal /MS [1]
3. 1.21		Tons /t
3. 2.		Display Accuracy 2
3. 2. 1	*	All digits
3. 2. 2		Reduced by 1 decimal place for load change
3. 2. 3		Reduced by 1 decimal place [1]
3. 2. 4		Reduced by 2 decimal places [1]
3. 2. 5		Reduced by 3 decimal places [1]
9. 1.		**Restore Factory Settings for WP1 Numeric Menu**
9. 1. 1		Yes
9. 1. 2	*	No

[1]) = Not available on instruments verified for use in legal metrology
[2]) = Factory setting on instrument verified for use in legal metrology
[3]) = Menu depends on weighing instrument model



1) = Menu depends on weighing instrument model
2) = not with setting 5.6.2 (8 bits)
3) = Not with setting 5.6.1 (7 bits)

Configuration



Time-dependent automatic data output
1 display update
2 display updates
10 display updates
100 display updates

Data Output: Line Format
For raw data: 16 characters
For other applications: 22 characters

Restore Factory Settings for Numeric Menu COM1: SBI
Yes
No

XBPI-232

MP8 Interface Emulation

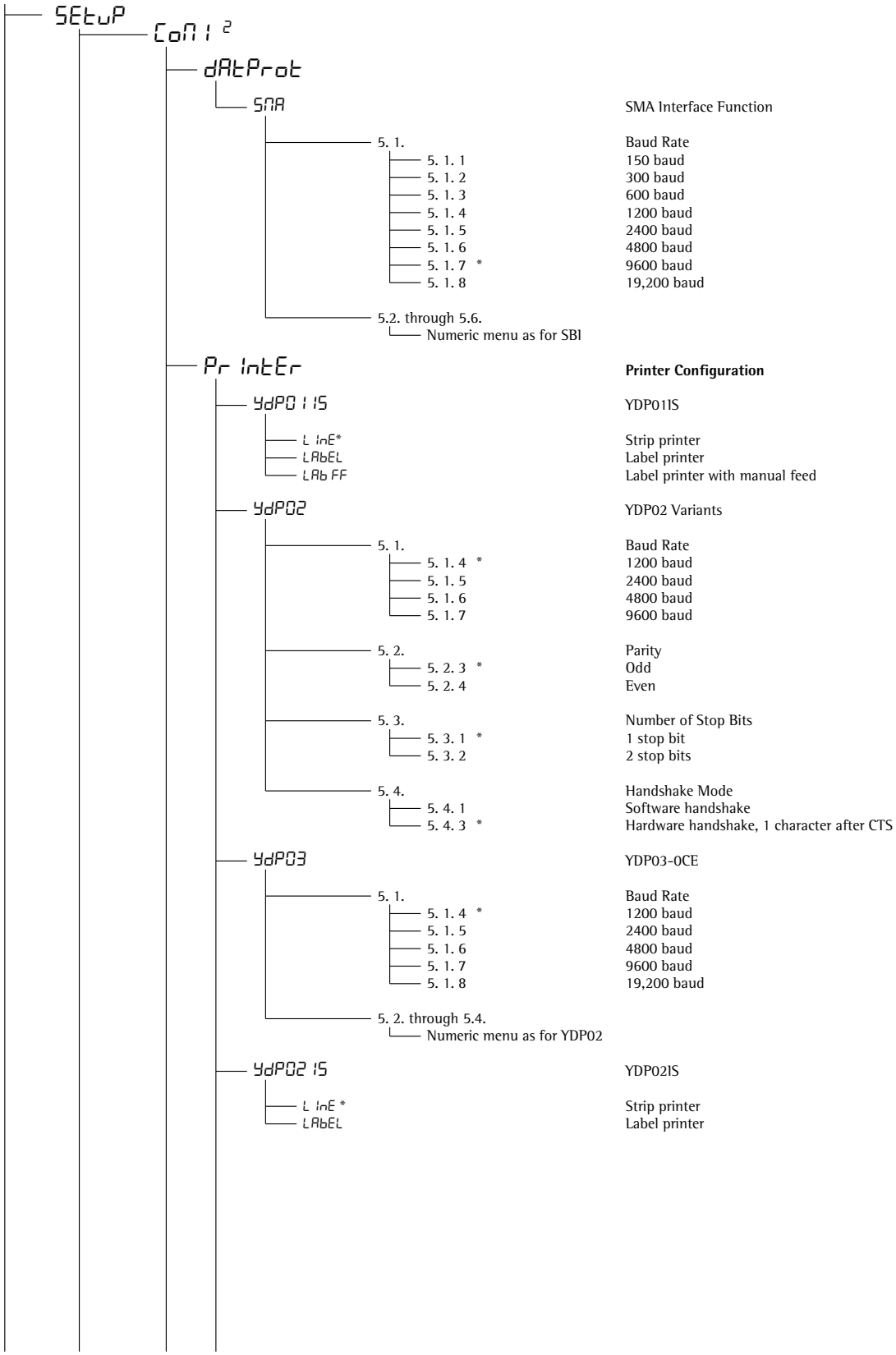
Program selection
MP8: 3-1-1
MP8: 3-1-9
MP8: 3-2-1
MP8: 3-2-9
MP8: 3-3-1
MP8: 3-3-9

Index 2
Ind. 2.1
Ind. 2.2
Ind. 2.3
Ind. 2.4

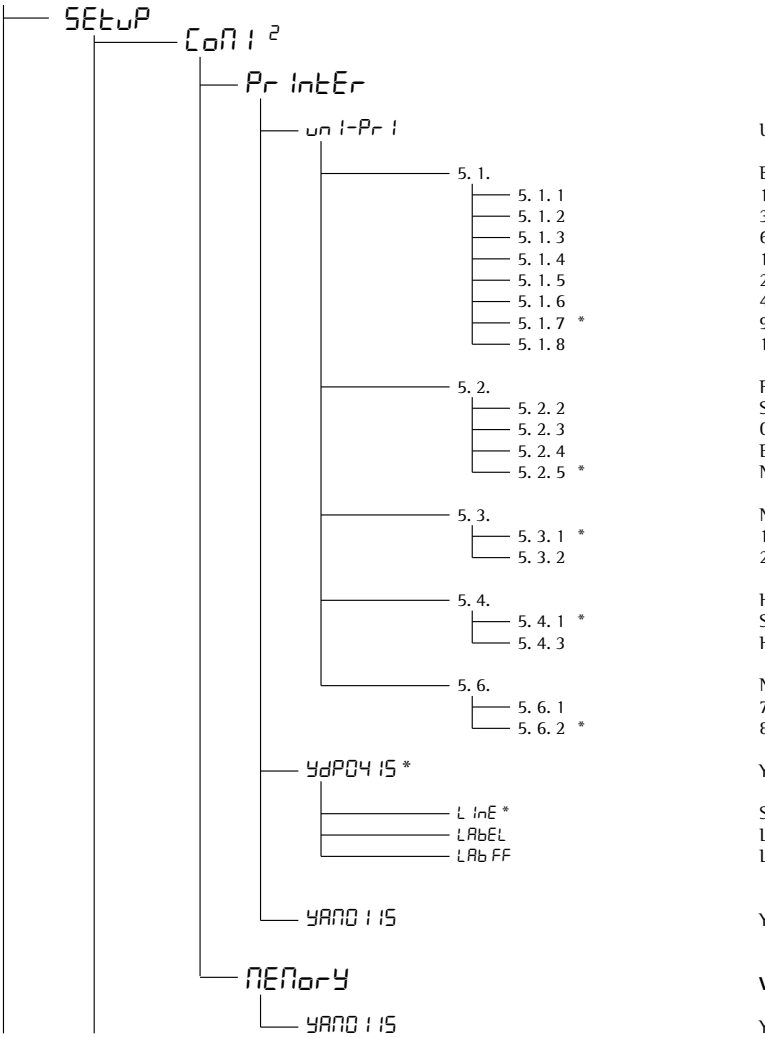
Baud Rate
150 baud
300 baud
600 baud
1200 baud
2400 baud
4800 baud
9600 baud

Parity
Mark
Space
Odd
Even

Manual/Auto Print Mode
Manual without stability
Manual after stability
Automatic without stability
Automatic at stability


SEtuP
CoM 1 2
dAtProt
SMA
SMA Interface Function
5. 1.
Baud Rate
5. 1. 1
150 baud
5. 1. 2
300 baud
5. 1. 3
600 baud
5. 1. 4
1200 baud
5. 1. 5
2400 baud
5. 1. 6
4800 baud
5. 1. 7 *
9600 baud
5. 1. 8
19,200 baud
5.2. through 5.6.
Numeric menu as for SBI
Pr IntEr
Printer Configuration
YdP01 IS
YDP01IS
L InE*
Strip printer
LAbEL
Label printer
LAb FF
Label printer with manual feed
YdP02
YDP02 Variants
5. 1.
Baud Rate
5. 1. 4 *
1200 baud
5. 1. 5
2400 baud
5. 1. 6
4800 baud
5. 1. 7
9600 baud
5. 2.
Parity
5. 2. 3 *
Odd
5. 2. 4
Even
5. 3.
Number of Stop Bits
5. 3. 1 *
1 stop bit
5. 3. 2
2 stop bits
5. 4.
Handshake Mode
5. 4. 1
Software handshake
5. 4. 3 *
Hardware handshake, 1 character after CTS
YdP03
YDP03-0CE
5. 1.
Baud Rate
5. 1. 4 *
1200 baud
5. 1. 5
2400 baud
5. 1. 6
4800 baud
5. 1. 7
9600 baud
5. 1. 8
19,200 baud
5. 2. through 5.4.
Numeric menu as for YDP02
YdP02 IS
YDP02IS
L InE *
Strip printer
LAbEL
Label printer

Configuration



Universal Interface

Baud Rate
150 baud
300 baud
600 baud
1200 baud
2400 baud
4800 baud
9600 baud
19,200 baud

Parity
Space [1])
Odd
Even
None [2])

Number of Stop Bits
1 stop bit
2 stop bits

Handshake Mode
Software handshake
Hardware handshake, 1 character after CTS

Number of Data Bits
7 data bits
8 data bits

YDP04IS

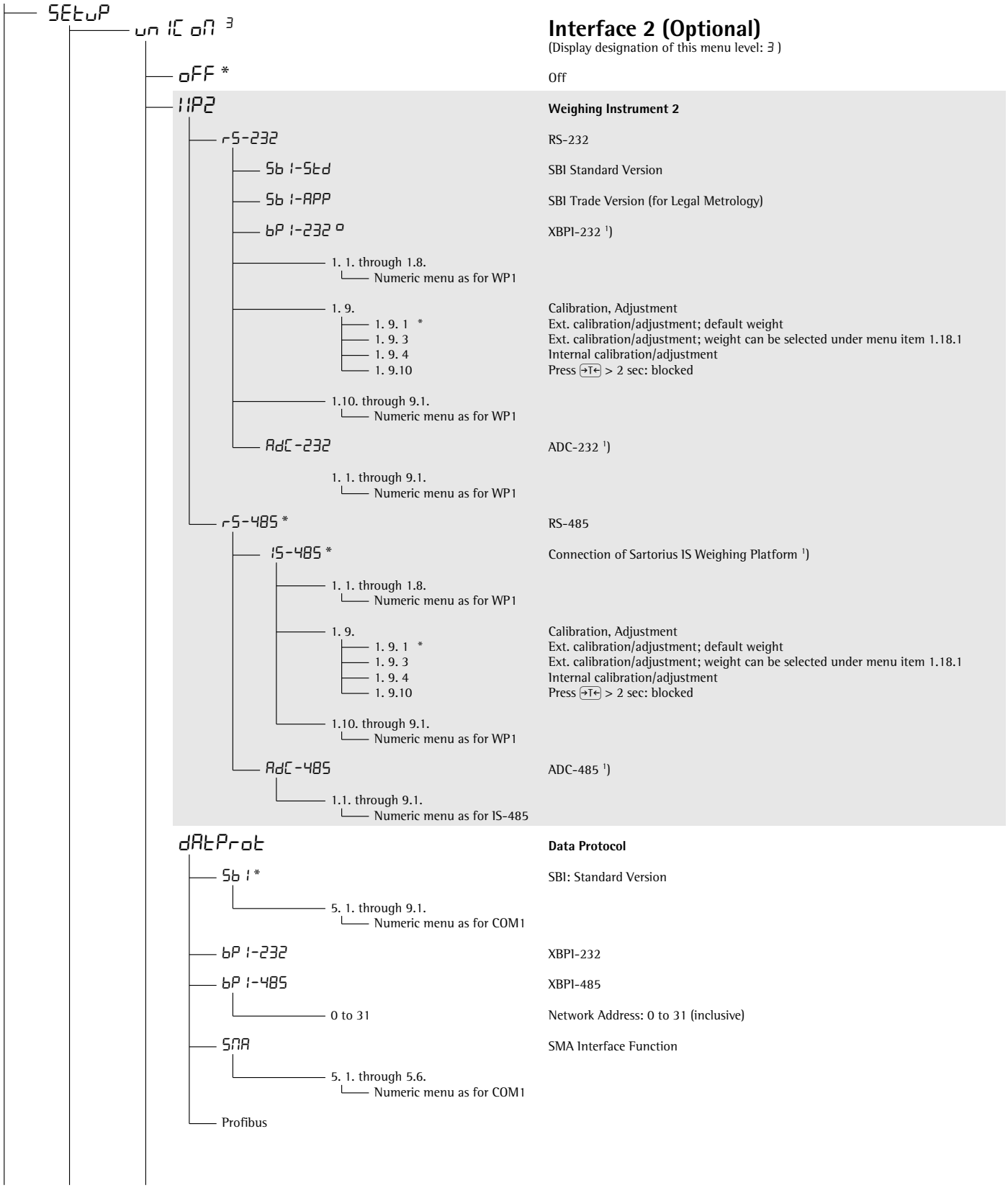
Strip printer
Label printer
Label printer with manual feed

YAM011S as electronic memory for print data

Verifiable Data Memory

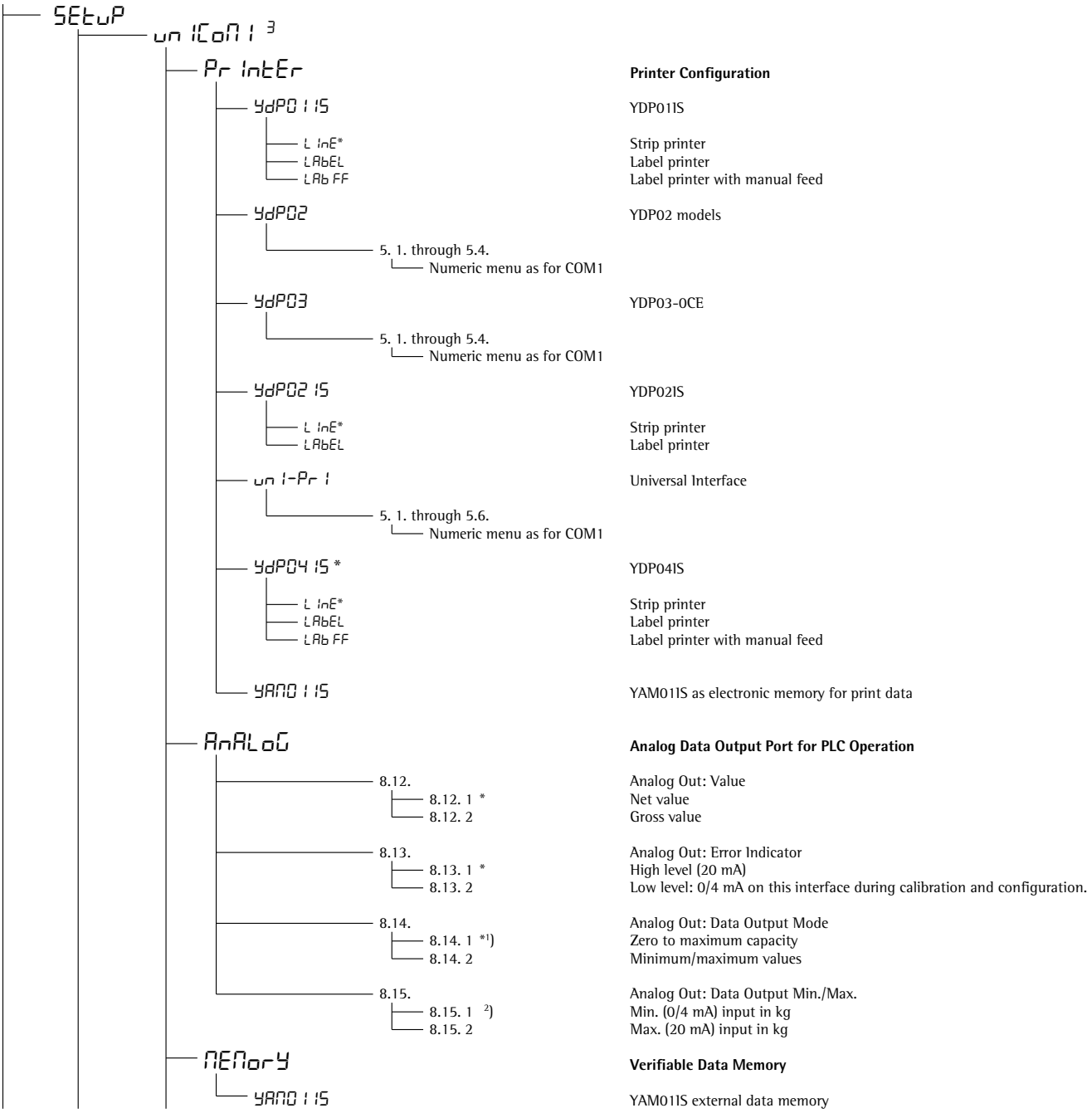
YAM011S external data memory

[1]) = Not with setting 5.6.2 (8 bits)
[2]) = Not with setting 5.6.1 (7 bits)

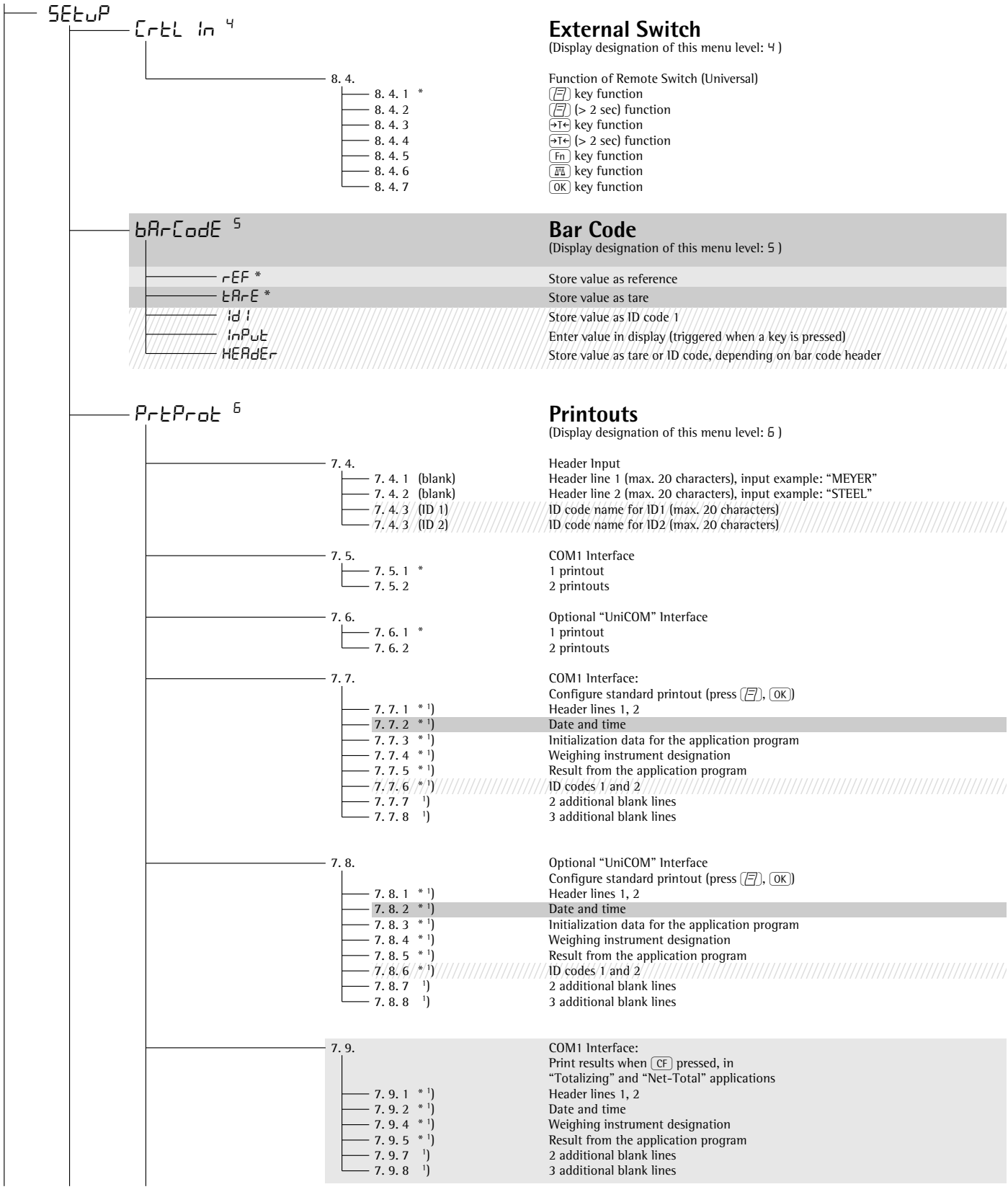


1) = Menu depends on connected weighing instrument

Configuration



[1]) = When setting 8.14.1 is active, the analog data output only works for XBPI weighing instruments
[2]) = Not with setting 8.14.1



1) = More than one can be selected

SEtuP
PrtProt 6

- 7.10. — Optional “UniCOM” Interface; Print results when CF pressed, in “Totalizing” and “Net-Total” applications
  - 7.10. 1 * [1]) — Header lines 1, 2
  - 7.10. 2 * [1]) — Date and time
  - 7.10. 4 * [1]) — Weighing instrument designation
  - 7.10. 5 * [1]) — Result from the application program
  - 7.10. 7 [1]) — 2 additional blank lines
  - 7.10. 8 [1]) — 3 additional blank lines
- 7.11. — ISO/GMP-compliant Printout
  - 7.11. 1 * — Off
  - 7.11. 2 — Always for one measurement result
  - 7.11. 3 — Always for multiple measurement results
- 7.12. — Date/time printout line: Time not printed
  - 7.12. 1 * — Off
  - 7.12. 2 — On
- 7.13. — One-time automatic printout at stability
  - 7.13. 1 * — Off
  - 7.13. 2 — On
- 7.14. — FlexPrint
  - 7.14. 1 * — Off
  - 7.14. 2 — On
- 9. 1. — Restore Factory Settings of the Numeric Menu for Data Protocol
  - 9. 1. 1 — Yes
  - 9. 1. 2 * — No

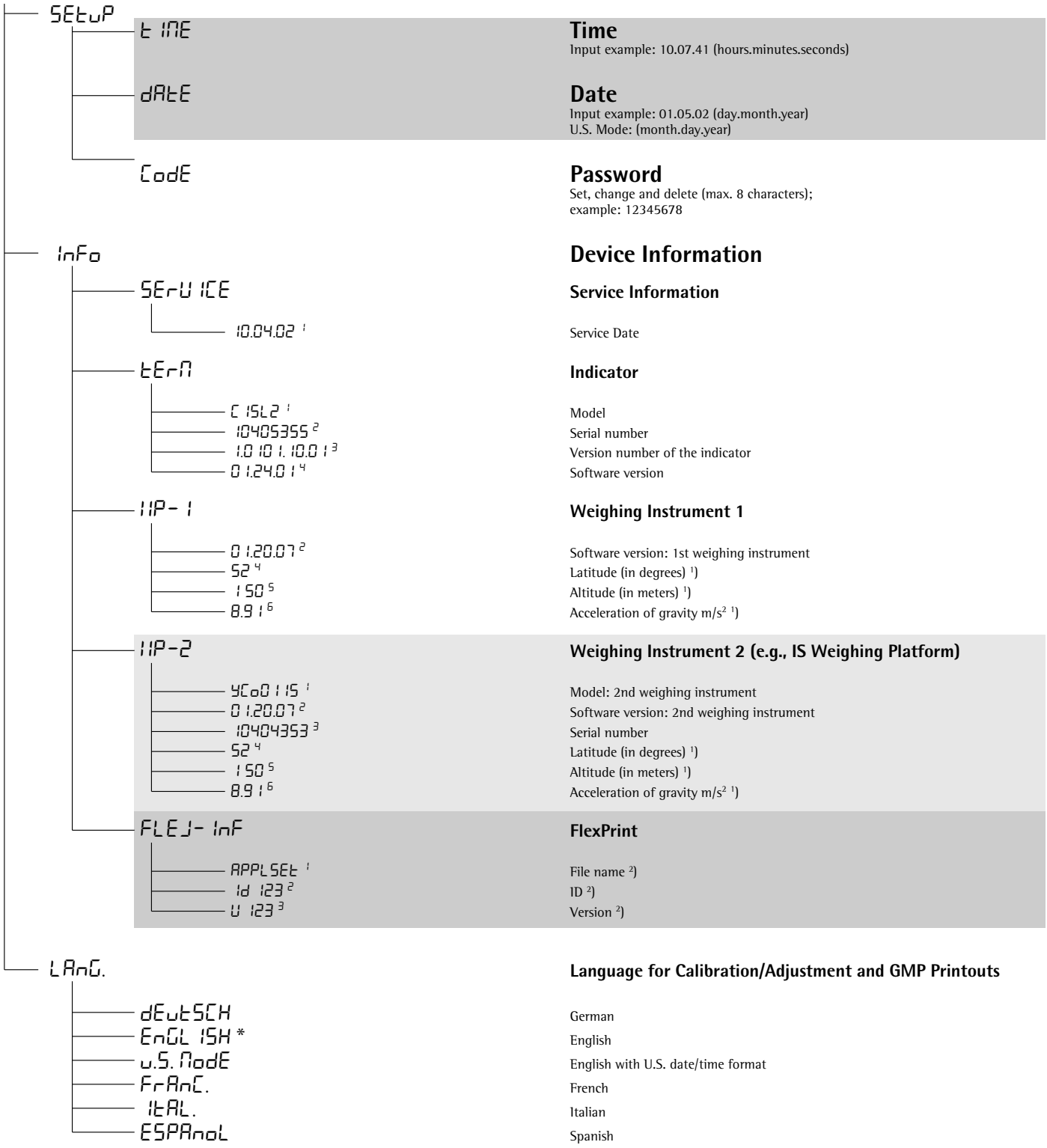
uSEr 7

Operation

(Display designation of this menu level: 7)

- 8. 2. — Acoustic Signal
  - 8. 2. 1 * — On
  - 8. 2. 2 — Off
- 8. 3. — Keys
  - 8. 3. 1 * — Accessible
  - 8. 3. 2 — Blocked
- 8. 7. — Automatic Shutoff, Indicator
  - 8. 7. 1 — Automatic shutoff acc. to menu item 8. 9.
  - 8. 7. 2 * — No automatic shutoff
- 8. 8. — Display Lighting
  - 8. 8. 1 * — On
  - 8. 8. 2 — Off
  - 8. 8. 3 — Automatic shutoff acc. to menu item 8.9.
- 8. 9. — Timer
  - 8. 9. 1 * — After 1 + 1 minute not in use (after 1 min.: warning [2]) displayed for 2 minute)
  - 8. 9. 2 — After 2 + 2 minutes not in use (after 2 min.: warning displayed [2]) for 2 minutes)
  - 8. 9. 3 — After 5 + 5 minutes not in use (after 5 min.: warning [2]) displayed for 5 minutes)
- 8.11. — First Instrument Displayed
  - 8.11. 1 * — Weighing instrument WP1
  - 8.11. 2 — Weighing instrument WP2
- 8.12. — Show the Geographical Data before Calibration
  - 8.12. 1 * — No
  - 8.12. 2 — Yes
- 9. 1. — Restore Factory Settings of the Numeric Operating Menu
  - 9. 1. 1 — Yes
  - 9. 1. 2 * — No

[1]) More than one can be selected
[2]) Warning: “ΔΔ” and 12 flash simultaneously

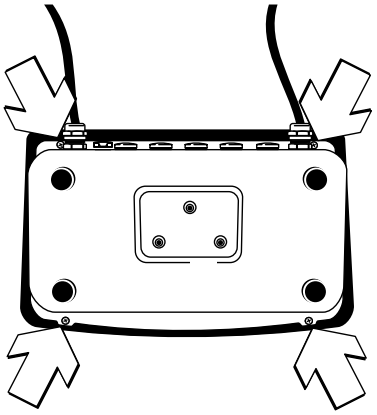


1) Output: either latitude and altitude or acceleration of gravity (depends on the input before verification)
2) These three parameters are shown for each file loaded

Connecting a Weighing Instrument to WP1

Instructions for connecting an analog Sartorius platform model CAPP, CAPS, IU or IF, or a commercially available strain-gauge load cell as WP1.

⚠ The load cell should be connected only by a trained and authorized Sartorius technician. Any installation work that does not conform to the instructions in this manual will result in forfeiture of all claims under the manufacturer's warranty.

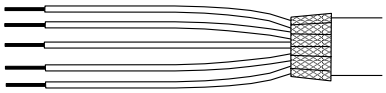


⚠ Disconnect the equipment from power (unplug from the wall socket) before beginning any installation work.

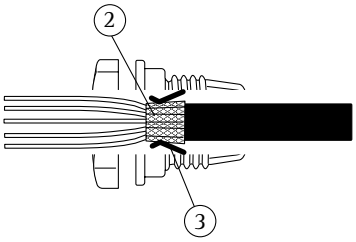
- Set up the weighing platform (see the operating instructions for the weighing platform)
- Lay the cable for connecting the weighing platform to the indicator
- Open the Combics indicator:
  remove the four cap nuts from the front panel and remove the panel.

- Connecting the wires inside the indicator:

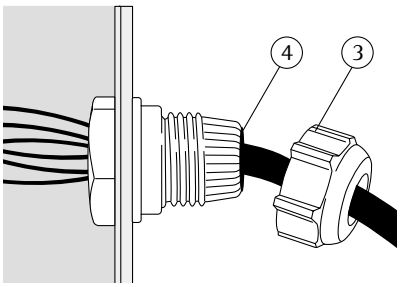
⚠ An IP67-protected cable gland is installed on the indicator at the factory.
Please use extreme caution when performing any work on the equipment that affects this cable gland. Use a torque wrench and tighten the cable gland to 5 Nm.



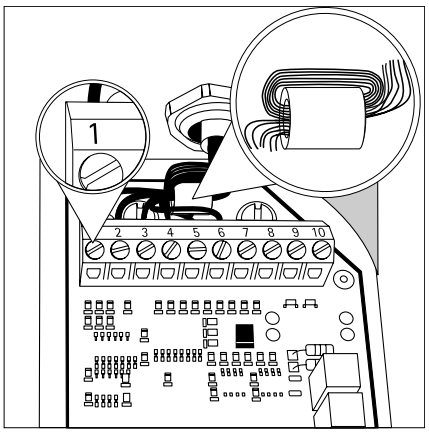
- Expose approx. 14 cm (5.5 in) of the cable end for installation
- Remove all but approx. 2 cm (< 1 in) of the shielding and fold it back over the casing
- Strip the casing from approximately 5 mm (1/2 in) of the wires and attach ferrules to the wire ends.



- Slide the cable gland over the cable until the clamps (2) are in contact with the shield (1)



- Tighten the nut (3) until the seal (4) between the nut and the cable forms a slight ridge between nut and cable.
- Make sure the shield is in contact with the clamps.



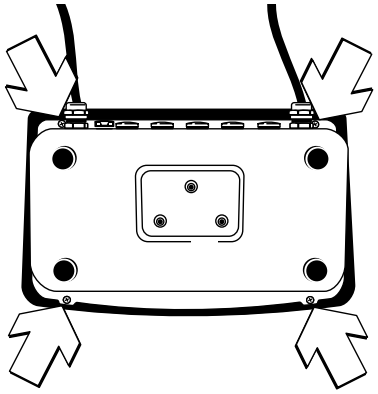
● Connecting the cable:
– Guide the wires through the ferrite ring, wrap them around the ring once and guide them through the ferrite ring again
– Attach the wires securely to the screw terminals

Wiring assignments:

No.	Signal name	Meaning
1	BR_POS	Bridge supply voltage (+)
2	SENSE_POS	Sense (+) for the bridge supply voltage
3	OUT_POS	Measuring voltage, positive
4	OUT_NEG	Measuring voltage, negative
5	SENSE_NEG	Sense (-) for bridge supply voltage
6	BR_NEG	Bridge supply voltage (-)

⚠ Please refer to the service specifications or operating instructions for the load cell or weighing platform in question for details on the assignment of wire colors to signals. Isolate unused wires in accordance with industry standards

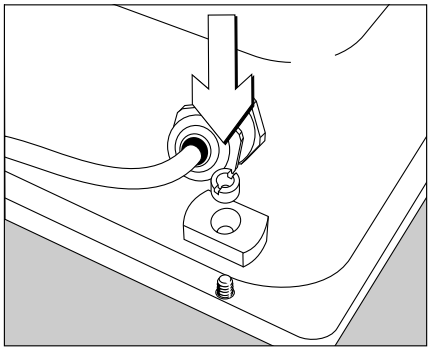
⚠ If a load receptor that uses 4-conductor technology is connected (i.e., the cable from the load cell has only four wires), add wire straps to connect wires 1 and 2 (BR_POS and SENSE_POS) to wires 5 and 6 (SENSE_NEG and BR_NEG).



● Close the Combics indicator:
Position the front panel on the indicator and attach it with the 4 cap nuts

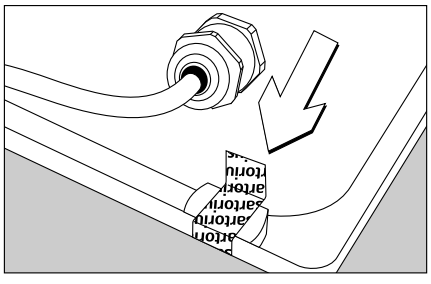
Installing the Verification Adapter for Use in Legal Metrology

(on verifiable models only)



– If a verifiable weighing platform has been connected, the “Verification Adapter” must be attached to the indicator on conclusion of platform installation. This prevents unauthorized removal of the front panel.

● Remove one of the cap nuts that attaches the front panel
● Place the verification adapter on the screw and attach it with the slotted screw



● Affix the control seal over the adapter and the screw

Service Menu

Purpose
The “Service” menu contains additional configuration options in the operating menu (SEtuP) that are only available when the “Service” mode is active. The service menu must be activated to perform the main calibration/adjustment operations affecting the indicator and the connected weighing instrument.

When the service mode is active, an “S” is shown in the upper right-hand corner of the display. The service mode is deactivated when the indicator is restarted (switched off and then on again).

The following advanced functions are available in the service mode:

The following menu items are appended to the “Date” (dAtE) and “Password” (CodE) menu items:
- Date of service S-dAtE (input of the next scheduled service date)
- Memory number MEM-no (input of transaction no. for external Alibi memory)
- Model designation model
- Indicator serial number SEr-no (input of the device serial no.)
- The following menu items are appended to the numeric menus for WP1 (1iP 1) and WP2 (1iP2) for configuring the weighing instruments:

1. 9.	Calibration and Adjustment
1. 9. 5	Internal linearization (WP2 only)
1. 9. 6	External linearization with default weights
1. 9. 7	External linearization with user-defined weights (enter under 1.18)
1. 9. 8	Set preload
1. 9. 9	Clear preload
1. 18.	Entering Calibration/Adjustment and Linearization Weights
1. 18. 2	Enter linearization weight 1
1. 18. 3	Enter linearization weight 2
1. 18. 4	Enter linearization weight 3
1. 18. 5	Enter linearization weight 4
1. 19.	Calibration without Weights (Enter Load Cell Specifications)
1. 19. 1	Nominal capacity
1. 19. 2	Resolution
1. 19. 3	Sensitivity in mV/V for load cell 1 (or mean derived from all load cells)
1. 19. 4	Sensitivity in mV/V for cell 2
1. 19. 5	Sensitivity in mV/V for cell 3
1. 19. 6	Sensitivity in mV/V for cell 4
1. 19. 7	Store values entered for 1.19
1. 20.	Place of Adjustment (Latitude and Altitude or Acceleration of Gravity at the Place of Installation)
1. 20. 1	Latitude in degrees
1. 20. 2	Altitude in meters above sea level
1. 20. 3	Acceleration of gravity
1. 20. 4	Store values entered for 1.20
11	A/D Converter Settings (See Pages 78/79 for Menu)
12.1	Store Weighing Instrument Serial Number (Verified Weighing Instrument, Connected to WP2)
12.1.1	Store serial number
12.1.2	Inactive (standard WP)

Activating the Service Mode



Select the SEtuP menu item

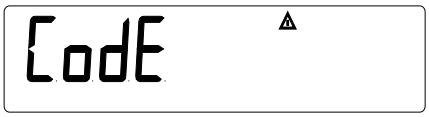
→T←

Open the SEtuP menu
If password input is prompted, enter the service access code (see Appendix) and confirm input to continue
If no password prompt is displayed:



Fn

Select the CodE menu item
(Press Fn repeatedly until CodE is displayed)



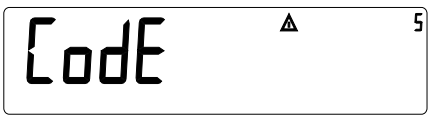
→T←

Select the CodE menu item and enter the service access code (see Appendix)



→T←

Confirm the service access code
Service mode is active: an "5" is shown in the upper right-hand corner of the display.



→0←, →0←

Return to the "Setup" menu, now in service mode.



Configuring the Analog/ Digital Converter (ADC)

Purpose
Adapt the parameters of the analog/ digital converter to the connected load cell or weighing instrument. Once these parameters have been configured, the A/D converter in conjunction with the load cell(s) is defined as a weighing instrument.

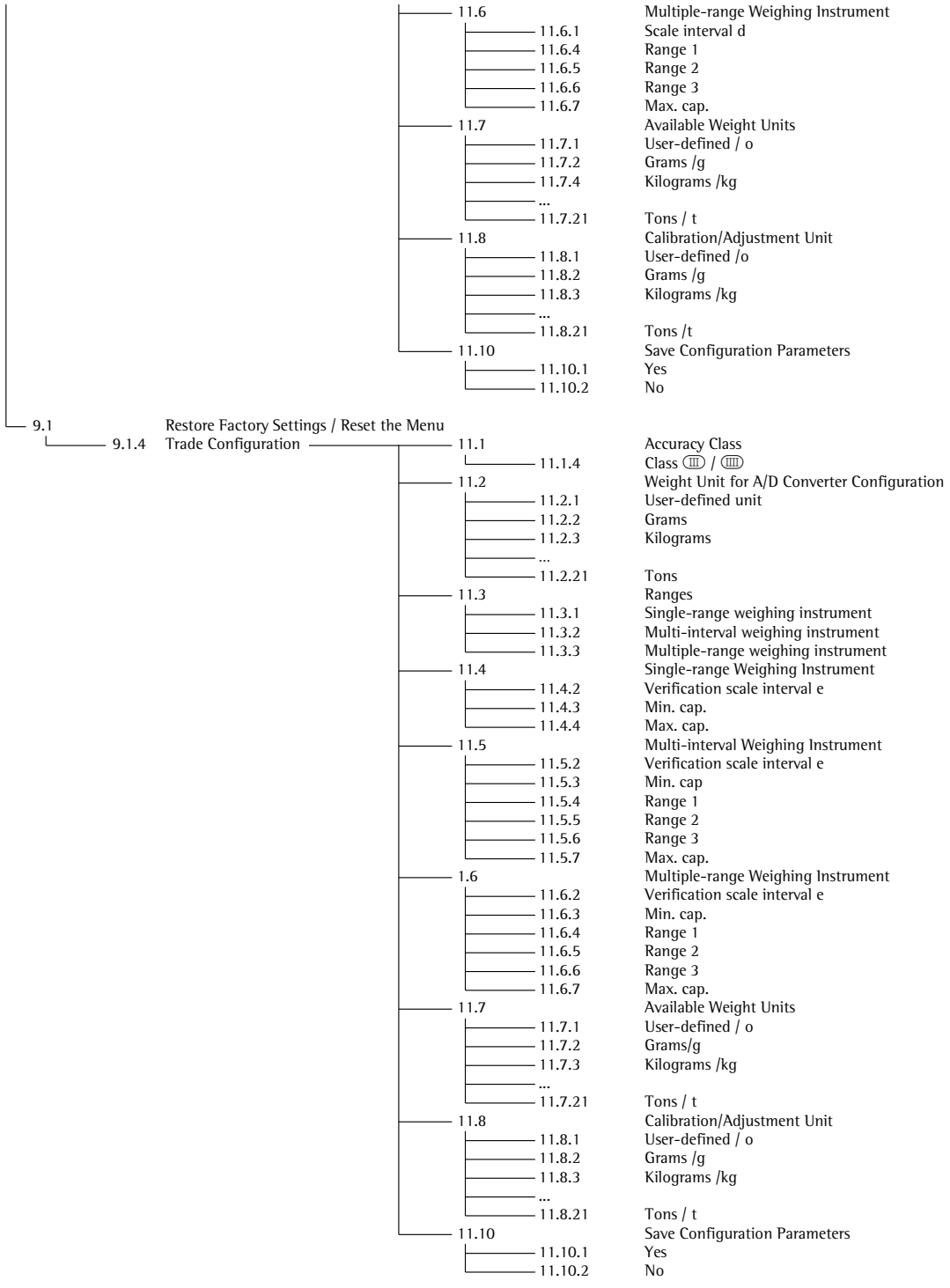
Note on Settings
- The A/D converter can be configured only in the service mode and only with the menu access switch open. Make sure you close the menu access switch following A/D converter configuration; otherwise, the “overload” (H) and “underload” (L) error codes are not shown.
- Configure the A/D converter in the Setup menu (in service mode) for the first weighing instrument under “WP- 1” and for the second weighing instrument under “CAN 1, WP-2” or “UNIT CAN, WP-2.” Settings are configured in the corresponding numeric menu under menu item 11.
- Before configuring the A/D converter, you must define whether the weighing instrument is to be used in the “standard” mode or in the “trade” mode (verified for use in trade/legal metrology), under menu item 9.1.
- Enter the maximum capacity (max. cap.) in a suitable weight unit, without decimal places (the rounding function will cut off any decimal places).

⚠ If you return to the highest level of the numeric menu without saving changes (menu item 11.10), all changes made up to that point are lost.
- The menu-reset function (“Restore Factory Settings”) does not affect settings for A/D converter configuration.

⚠ Note:
Once the A/D converter configuration has been locked (menu access switch closed), the indicator can no longer be used to influence weighing results. The scope of functions available in the weighing instrument is defined by the A/D converter. Weighing functions that can be activated include: read weight value, tare, calibrate/adjust, read tare value, save/delete tare input

Diagram of the Menu for A/D Converter Configuration
The following menu items are appended to the numeric menus for WP1 (WP- 1) and WP2 (WP-2) in the service mode for configuring the A/D converter:

- 9.1 Restore Factory Settings / Reset the Menu
  - 9.1.3 Standard Configuration
    - 11.2 Weight Unit for A/D Converter Configuration
      - 11.2.1 User-defined unit
      - 11.2.2 Grams
      - 11.2.3 Kilograms
      - 11.2.4 Carats
      - 11.2.5 Pounds
      - 11.2.6 Ounces
      - 112.7 Troy ounces
      - 11.2.8 Hong Kong taels
      - 11.2.9 Singapore taels
      - 11.2.10 Taiwanese taels
      - 11.2.11 Grains
      - 11.2.12 Pennyweights
      - 11.2.13 Milligrams
      - 11.2.14 Parts per pound
      - 11.2.15 Chinese taels
      - 11.2.16 Mommes
      - 11.2.17 Austrian carats
      - 11.2.18 Tola
      - 11.2.19 Baht
      - 11.2.20 Mesghal
      - 11.2.21 Tons
    - 11.3 Ranges
      - 11.3.1 Single-range weighing instrument
      - 11.3.2 Multi-interval weighing instrument
      - 11.3.3 Multiple-range weighing instrument
    - 11.4 Single-range Weighing Instrument
      - 11.4.1 Scale interval d
      - 11.4.4 Max. cap.
    - 11.5 Multi-interval Weighing Instrument
      - 11.5.1 Scale interval d
      - 11.5.4 Range 1
      - 11.5.5 Range 2
      - 11.5.6 Range 3
      - 11.5.7 Max. cap.


11.6 Multiple-range Weighing Instrument
11.6.1 Scale interval d
11.6.4 Range 1
11.6.5 Range 2
11.6.6 Range 3
11.6.7 Max. cap.
11.7 Available Weight Units
11.7.1 User-defined / o
11.7.2 Grams /g
11.7.4 Kilograms /kg
...
11.7.21 Tons / t
11.8 Calibration/Adjustment Unit
11.8.1 User-defined /o
11.8.2 Grams /g
11.8.3 Kilograms /kg
...
11.8.21 Tons /t
11.10 Save Configuration Parameters
11.10.1 Yes
11.10.2 No
9.1 Restore Factory Settings / Reset the Menu
9.1.4 Trade Configuration
11.1 Accuracy Class
11.1.4 Class III / IIII
11.2 Weight Unit for A/D Converter Configuration
11.2.1 User-defined unit
11.2.2 Grams
11.2.3 Kilograms
...
11.2.21 Tons
11.3 Ranges
11.3.1 Single-range weighing instrument
11.3.2 Multi-interval weighing instrument
11.3.3 Multiple-range weighing instrument
11.4 Single-range Weighing Instrument
11.4.2 Verification scale interval e
11.4.3 Min. cap.
11.4.4 Max. cap.
11.5 Multi-interval Weighing Instrument
11.5.2 Verification scale interval e
11.5.3 Min. cap
11.5.4 Range 1
11.5.5 Range 2
11.5.6 Range 3
11.5.7 Max. cap.
1.6 Multiple-range Weighing Instrument
11.6.2 Verification scale interval e
11.6.3 Min. cap.
11.6.4 Range 1
11.6.5 Range 2
11.6.6 Range 3
11.6.7 Max. cap.
11.7 Available Weight Units
11.7.1 User-defined / o
11.7.2 Grams/g
11.7.3 Kilograms /kg
...
11.7.21 Tons / t
11.8 Calibration/Adjustment Unit
11.8.1 User-defined / o
11.8.2 Grams /g
11.8.3 Kilograms /kg
...
11.8.21 Tons / t
11.10 Save Configuration Parameters
11.10.1 Yes
11.10.2 No

Descriptions of the Individual Menu Items for A/D Converter Configuration

Standard/Trade Configuration (Menu Items 9.1.3 / 9.1.4)
Before configuring the A/D converter, you must define whether the weighing instrument is to be used in the "standard" mode or in the "trade" mode (verified for use in trade/ legal metrology).
- Standard configuration: 9.1.3
- Trade configuration: 9.1.4

Accuracy Class (Menu Item 11.1)
Shown only for "trade" configuration. Only menu item 11.1.4 (Accuracy class (III)/(IIII)) can be selected here. If the menu item is not marked with a circle (o) indicating it is already active, press →T← repeatedly until this menu item is activated.

Select Configuration Unit (Menu Item 11.2)
The weight unit to be used for configuring the A/D converter must be selected here.

Selecting the Weighing Range (Menu Item 11.3)
This setting defines whether menu items 11.5, 11.6 and 11.7 for further configuration steps are shown or hidden.
- Single-range weighing instrument (11.3.1)
  The entire weighing range is divided into scale intervals on the basis of the lowest interval d and the maximum load. Readability is equal to scale interval d.
- Multiple-range weighing instrument (11.3.2)
  A multiple-range weighing instrument has two or three weighing ranges. When the maximum capacity of a lower range is exceeded, the weighing instrument switches to a higher range (lower resolution) and remains in that range. The weighing instrument can be returned to the lower weighing range (higher resolution) only by pressing the →0← key and then unloading the weighing instrument.
- Multi-interval weighing instrument (11.3.3)
  By activating the "Multi-interval weighing instrument" function you can divide the weighing capacity into as many 3 weighing ranges, each with a different readability. The weighing instrument switches from one range to the next automatically, in accordance with the range limits specified. Once the weighing instrument has been tared, the highest possible resolution is available even if the weighing instrument is loaded.

Scale Interval d
Scale interval d indicates the resolution of the weighing instrument. The scale interval d can be entered only in increments of 1, 2, 5, 10, 20, 50, etc.
This menu item is not shown when the "trade" configuration is active. On verifiable or verified weighing instruments (class (III) and (IIII)) scale interval d is equal to verification scale interval e.

Verification Scale Interval e
The verification scale interval e indicates the resolution of the weighing instrument in legal metrology. The scale interval d can be entered only in increments of 1, 2, 5, 10, 20, 50, etc.
This menu item is not shown when the "standard" configuration is active.

Maximum Capacity (Max. Cap.)
The maximum capacity is the maximum load that may be placed on the weighing instrument. If a heavier load is placed on the instrument, the display shows *H*.
The scale intervals are calculated from the maximum capacity and the scale interval d (e.g., a maximum capacity of 15,000 kg with a lowest scale interval d of 0.005 yields 3000 scale intervals).
In legal metrology, the number of intervals must not exceed 3000 e; for multi-interval weighing instruments, the limit is 3000 e per range.
In "standard" operation, as opposed to legal metrology, you can define a "SuperRange" weighing instrument with more than 3000 intervals. These parameters, however, may be influenced by physical restrictions.

Minimum Capacity (Min. Cap.)
This menu item is not shown when the "standard" configuration is active.
The minimum capacity of the connected weighing instrument is entered here.
The minimum capacity for weighing instruments of class (III) is 20 e;
for class (IIII) instruments, it is 10 e.
Note: The function of the minimum capacity setting is to warn operators that below this limit, the summation of tolerances might lead to significant measurement errors. In Germany, for example, initial weights below the minimum capacity are not allowed.

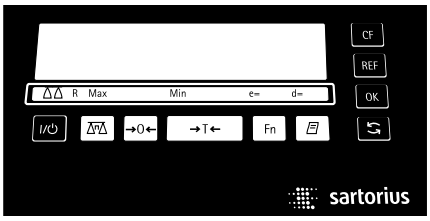
Range 1, Range 2, Range 3
Here you can enter the limits for each of the weighing ranges. When a limit is exceeded, the accuracy changes.
The following applies when entering range limits:
Range 1 ≤ range 2 ≤ range 3 ≤ maximum capacity
Thus the weighing capacity can be divided into 4 ranges. The display resolution changes in intervals of 1, 2, 5, 10, 20 etc. The lowest resolution is the lowest scale interval d. Ranges you do not require should be set to 0.

Available Weight Units (Menu Item 11.7)
The weight units available for use in the normal weighing mode are selected here. Available units are indicated by a circle (o) on the display (more than one can be selected).

Calibration/Adjustment Unit (Menu Item 11.8)
The weight unit used for calibration/ adjustment of the weighing instrument is selected here. The unit selected here is used for calibration/adjustment even if a different unit is selected for the normal weighing mode.

Save Configuration Parameters (Menu Item 11.10)
Save the A/D converter configuration by selecting menu item 11.10.1.

Checking and Configuring the Equipment for Use in Legal Metrology
A metrological ID tag is included with the Combics indicator.
Following A/D converter configuration, write the metrological data on this tag for all weighing ranges. Affix this tag below the display and cover it with the waterproof acetate overlay.

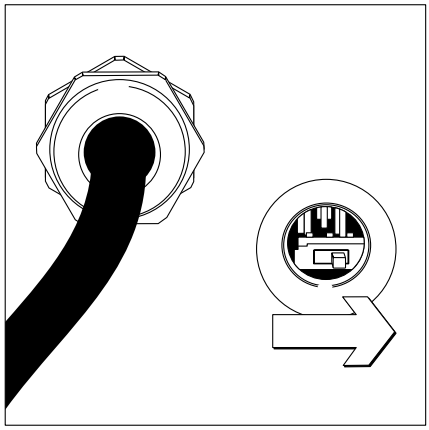


Open menu item 1.7 to make sure only the permitted weight units are accessible.

Configuring the A/D Converter (ADC)

Open the menu access switch.

- Remove the cap that covers the menu access switch on the left-hand side of the back of the indicator housing.
- Move the switch to the right (towards the interface connectors; “open” position)

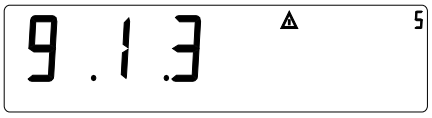




Activate the service mode (see page 77)



Select the weighing instrument to be configured (in this example, IIP- I)



Under menu item 9.1, select “standard” (9.1.3) or “trade” (9.1.4) configuration

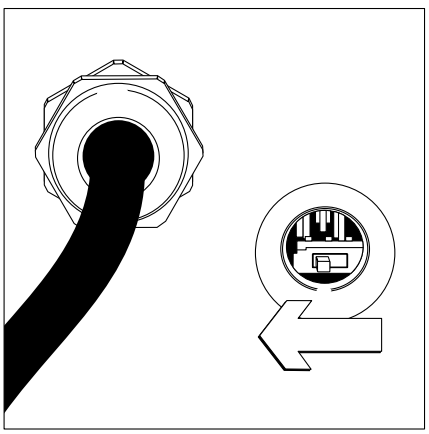


Open menu item 11 to configure the A/D converter



Following configuration, select menu item 11.10.1 to save your settings.
The Combics is automatically re-started.

The A/D converter, in conjunction with the weighing instrument, can now be used like any standard weighing instrument.



Close the menu access switch

Following A/D converter configuration, the weighing instrument must be calibrated/adjusted (perform calibration/adjustment and linearization; see page 20, “Calibration and Adjustment,” and page 89, “Calibration/Adjustment without Weights” for details)

Entering Geographical Data

Purpose
To perform an external adjustment of the weighing instrument at a place of adjustment that is not the same as the place of installation (e.g., at the factory or on the dealer's premises). If the weighing instrument is adjusted at the place of installation, it is not necessary to enter the geographical data.

The sensitivity of a weighing instrument can change depending on its place of installation, because it is affected by local gravity – or, more precisely, by the acceleration of gravity. When the geographical data is stored, the place of installation can be changed following external adjustment.

Calibration/adjustment of a weighing instrument is valid at the place of installation and within a specific tolerance range around that location. With 3000 e, for example, the tolerance zone is ±100 km of the geographical latitude, and ±200 m of the elevation above sea level.

The following exception applies in Germany ("Zone D"):
If the latitude and altitude are set to
- 51.00° North and
- 513 meters above sea level,

the weighing instrument can be used anywhere in Germany. The acceleration of gravity applicable for "Germany (Zone D)" is 9.810 m/s^2.
The geographical data stored in the output device at the factory applies to Germany ("Zone D").
This setting is recommended for calibrating/adjusting weighing instruments to be used within Germany. Entering more precise geographical data will increase the weighing instrument's precision, but will also limit the tolerance zone.

Note on Settings
- Geographical data can be entered only in the service mode and only with the menu access switch open.
- Enter geographical data in the Setup menu (in service mode) for the first weighing instrument under "HP- 1" and for the second weighing instrument under "Con 1, HP-2" or "un 1Con, HP-2." Settings are configured in the corresponding numeric menu under menu item 1.20.
- Enter either the geographical latitude in degrees (menu item 1.20.1) together with the altitude above sea level (menu item 1.20.2), or enter the acceleration of gravity (menu item 1.20.3).
  If the acceleration of gravity has been entered, then this value takes precedence over the latitude and altitude; in this case, "99999.99" and "9999999" are displayed for latitude and altitude, respectively. If only altitude and latitude are entered, "0000000" is shown for the acceleration of gravity.

⚠ If you return to the highest level of the numeric menu without saving changes (menu item 1.20.4), all changes made up to that point are lost.

Procedure
- Open the menu access switch. If the indicator is part of a verified weighing system, the verification seal must be broken to move the switch. Afterwards, the weighing instrument must be re-verified.
- Activate the service mode
- Select the weighing instrument
- Enter geographical data for the place of adjustment under menu items 1.20.1 through 1.20.3 and select menu item 1.20.4 to save. This data can be obtained from the relevant land registry or Ordnance Survey.
- Perform external calibration/adjustment (see page 20)
- Following calibration/adjustment, enter the geographical data for the place of installation under menu items 1.20.1 through 1.20.3 and select menu item 1.20.4 to save.
- Close the menu access switch
- The weighing instrument can now be used at the place of installation, or anywhere within the tolerance zone.

  Note:
  To display geographical data during the calibration/adjustment procedure, select menu item 8.12.2 in the Setup menu, under ut IL It (factory setting: 8.12.1, geographical data not displayed).
  When the display of geographical data is active, the calibration procedure is as follows:
  When the calibration procedure is started (CAL), the display shows ALt Itud for 2 seconds (if latitude and altitude are used), followed by the configured value (indicating meters above sea level). Press →T← to confirm the data, or →0← to cancel. Next, the display shows LAt Itud for 2 seconds, followed by the value set for the geographical latitude (in degrees). Again, press →T← to confirm the data or →0← to cancel. Next, the prompt to place the adjustment weight appears. If the acceleration of gravity was entered rather than altitude and latitude, the word "GrAU ItY" appears for 2 seconds, followed by the value for the acceleration of gravity. Press →T← to confirm the data, or →0← to cancel.

Diagram of the Menu for Entering Geographical Data

1. 20.	Place of Adjustment (Latitude and Altitude or Acceleration of Gravity at the Place of Installation)
├── 1. 20. 1	Latitude in degrees
├── 1. 20. 2	Altitude in meters above sea level
├── 1. 20. 3	Acceleration of gravity
└── 1. 20. 4	Store values entered for 1.20

Entering Calibration/Adjustment and Linearization Weights

Purpose
For manual input of the calibration, adjustment and linearization weights.

Note on Settings
- Service mode must be active for entering the linearization weights under menu items 1.18.2 through 1.18.5.
- Enter calibration/adjustment and linearization weights in the Setup menu for the first weighing instrument under "LIP- 1" and for the second weighing instrument under "CAN 1, LIP-2" or "UNIT CAN, LIP-2." Settings are configured in the corresponding numeric menu under menu item 1.18.
- The service mode is not required for configuring menu item 1.18.1, "External user-defined weight."
- The calibration/adjustment and linearization weights must be entered in the weight unit specified in the A/D converter configuration under menu item 11.8.

Procedure
- Activating the service mode (required only for entering linearization weights)
- Select the weighing instrument
- Enter external user-defined weight under menu item 1.18.1
- Enter external linearization weights under menu items 1.18.2 through 1.18.5

Diagram of the Menu for Entering Calibration/Adjustment and Linearization Weights

1. 18.	Entering Calibration/Adjustment and Linearization Weights
1. 18. 1	Enter external user-defined calibration weight (service mode not required)
1. 18. 2	Enter linearization weight 1
1. 18. 3	Enter linearization weight 2
1. 18. 4	Enter linearization weight 3
1. 18. 5	Enter linearization weight 4

Function of the →T← Key (> 2 sec)

Purpose
Normally, when you press and hold the →T← key for longer than 2 seconds, the calibration/adjustment function is triggered. When the service mode is active, you can assign a different function to this key:

- External linearization with default weights (menu item 1.9.6)
- External linearization with the linearization weights specified under menu item 1.18 (menu item 1.9.7)
- Internal linearization (WP2 only) (menu item 1.9.5)
- Set the preload (menu item 1.9.8)
- Clear the preload (menu item 1.9.9)

⚠ Following linearization or after a preload is set or cleared, the normal function of the →T← key (> 2 sec) must be reset in the Setup menu (e.g., external calibration/adjustment with default weights)

Diagram of the Menu for Assigning the Function of the →T← Key (> 2 sec)

1. 9.	Calibration and Adjustment
1. 9. 1	External calibration/adjustment with default weights (service mode not required)
1. 9. 3	External calibration/adjustment with user-defined weights entered under 1.18 (service mode not required)
1. 9. 5	Internal linearization (WP2 only)
1. 9. 6	External linearization with default weights
1. 9. 7	External linearization with user-defined weights (enter under 1.18)
1. 9. 8	Set preload
1. 9. 9	Clear preload
1. 9. 10	Key blocked

External Linearization

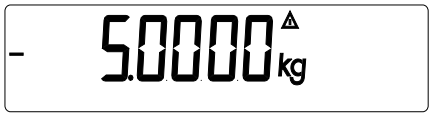
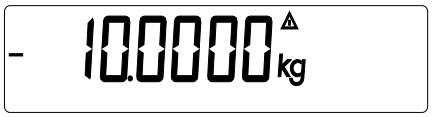
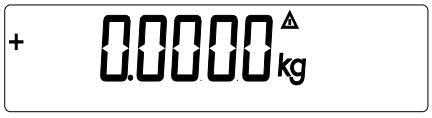
Note on Settings

⚠ External linearization can only be performed on verified weighing instruments when the menu access switch is open.

– The “external linearization” function must be assigned to the →T← key (> 2 sec) (menu item 1.9.6 or 1.9.7).

⚠ Following external linearization, close the menu access switch and reset the →T← key (> 2 sec) to its previous function (e.g., external calibration/ adjustment with user-defined weights) under menu item 1.9.

Procedure

→0←	Zero the weighing instrument
	
→T← > 2 sec	Start linearization
	After approx. 2 seconds, the first linearization weight is prompted
	Place the prompted weight on the weighing instrument. After a brief pause, the difference between the measured value and the true mass is displayed.
→T←	Store the linearization weight (press →0← to cancel)
	You are prompted to place the second linearization weight on the weighing instrument Repeat the steps described above for all linearization weights.
	After you store the last linearization weight, you are prompted to unload the weighing instrument.
	Unload the weighing instrument. After a brief pause, the zero point is stored automatically and the Combics indicator automatically returns to the normal weighing mode.

Setting the Preload

Note on Settings

⚠ The preload can be set only when the menu access switch is open.

– The “set preload” function must be assigned to the →T← key (> 2 sec) (menu item 1.9.8) (see page 85).

⚠ After setting the preload, close the menu access switch and reset the →T← key (> 2 sec) to its previous function (e.g., external calibration/adjustment with user-defined weights) under menu item 1.9.

Procedure

→0←

Zero the weighing instrument





Place a weight equal to the desired preload on the weighing instrument

→T← (> 2 sec)

Activate the “Set preload” function





After a brief pause, the preload is stored automatically and the Combics indicator automatically returns to the weighing mode.

Clearing the Preload

Note on Settings

⚠ The preload can be cleared only when the menu access switch is open.

– The “clear preload” function must be assigned to the →T← key (> 2 sec) (menu item 1.9.9) (see page 85).

⚠ After clearing the preload, close the menu access switch and reset the →T← key (> 2 sec) to its previous function (e.g., external calibration/adjustment with user-defined weights) under menu item 1.9.

Procedure



Remove a weight equal to the preload from the weighing instrument (the display shows a weight value with a minus sign)

→T← > 2 sec

Activate the “Clear preload” function





After a brief pause, the preload is cleared automatically and the Combics indicator automatically returns to the weighing mode.

Calibration/ Adjustment without Weights

You can perform calibration/adjustment without weights in the service mode by entering the load cell specifications.

Note on Settings

⚠ Calibration without weights is not permitted on weighing instruments used in legal metrology.

- Calibration/adjustment without weight can only be performed in service mode, and only when the menu access switch is open.
- Enter the parameters required for calibration/adjustment without weights in the Setup menu (in service mode) for the first weighing instrument under "HP- 1" and for the second weighing instrument under "CAN 1, HP-2" or "UNICAN, HP-2." Settings are configured in the corresponding numeric menu under menu item 1.19.
- The nominal capacity must be entered in kg.
- The resolution must be entered in kg and must be in agreement with the scale interval d entered for A/D converter configuration.
- Enter the sensitivity of the load cell in mV/V (usually listed in the load cell specification sheets).
- Note:
  Select menu item 1.19.7 to store the data entered. Once the A/D converter configuration data has been stored, these parameters can no longer be read.

Procedure

- Open the menu access switch
- Activate the service mode
- Select the weighing instrument
- Enter the nominal capacity of the load cell(s) in kg under menu item 1.19.1. If the weighing instrument has more than one load cell, multiply the nominal capacity accordingly (e.g., 4 load cells with 50 kg nominal capacity each yields a nominal capacity of 200 kg)
- Enter the resolution of the load cell(s) in kg under menu item 1.19.2. The value must be in agreement with the scale interval d entered under menu item 11.4.1.
- Enter the sensitivity of the load cell in mV/V under menu item 1.19.3.
- If the weighing instrument has multiple load cells, enter the individual values for the load cells under 1.19.3 through 1.19.6, or enter the mean value of all load cells under 1.19.3.
- Save the values entered for calibration/adjustment without weights by selecting menu item 1.19.7.
- Close the menu access switch

Diagram of the Menu for Calibration/Adjustment Without Weights

1.19		Calibration/Adjustment Without Weights (Enter Load Cell Specifications)
├	1.19.1	Nominal capacity
├	1.19.2	Resolution
├	1.19.3	Sensitivity in mV/V for load cell 1 (or mean derived from all load cells)
├	1.19.4	Sensitivity in mV/V for load cell 2
├	1.19.5	Sensitivity in mV/V for load cell 3
├	1.19.6	Sensitivity in mV/V for load cell 4
└	1.19.7	Store values entered for 1.19

Data Interfaces

The indicator is equipped with the following data interfaces:
- COM1: Standard interface (RS-232)
- UniCOM: Universal data interface (optional)

Both of these interfaces can be configured in the Setup menu for various input/output functions (e.g., Printer, second weighing instrument, PC, checkweighing/classification display). The optional UniCOM interface can be used for RS-232, RS-485 or RS-422 communication, or as voltage-/current (analog) interface. A bar code scanner (Combics 2 only) or an external rechargeable battery pack can be connected to the female UniCOM port (on CIS1/ CIS1N/CIS2 models, use the corresponding terminal screws).

Features
- Indicator models CISL1, CISL1N and CISL2 (IP44 protection):
  Connect via a 25-contact D-Sub female connector.
  Use a T-connector (see “Accessories”) to connect a second device to the same interface.
- Indicator models CIS1, CIS1N and CIS2 (IP67 protection):
  Route connecting cable from the peripheral device to the indicator via a cable gland. Then connect the free ends of the cable using the terminal screws.
  If you wish to connect a second peripheral device to the same interface port, use a separate cable gland to route the connecting cable of this device into the indicator.

⚠ **Warning When Using RS-232 Connecting Cables Not Supplied by Sartorius:**
The pin assignments in the cable might not be compatible with Sartorius equipment. Check all pin assignments against the cabling diagrams and disconnect any lines that are not assigned. Failure to do so may damage or even completely ruin your indicator and/ or peripheral device.

Specifications

Serial interface:

Operating mode:	Full duplex
Standard:	COM1: RS-232, UniCOM[1]: RS-232 or RS-422/RS-485
Interface connector:	CISL1, CISL1N and CISL2 indicators (IP44 protection): 25-contact D-Sub female connector CIS1, CIS1N and CIS2 indicators (IP67 protection): The cable is connected to terminal screws inside the housing and routed into the housing via a cable gland.
Transmission rates:	150, 300, 600, 1200, 2400, 4800, 9600 and 19,200 baud (depending on the operating mode)
Number of data bits:	7 or 8 bits
Parity:	Space, odd, even, none (depending on the operating mode)
Number of stop bits:	1 or 2 stop bits
Handshake mode:	Software (XON/XOFF) or hardware (1 character after CTS)
Communication mode:	SBI, XBPI-232[2], XBPI-485[1][2], MP8 binary[3], SMA Available printers: – YDP01IS – YDP02IS-Label – YDP01IS-Label – Universal – YDP02 – YDP04IS – YDP03 – YDP04IS-Label – YDP02IS – YAM01IS Alibi memory
Network address [4]:	0, 1, 2, (...), 31
SBI: Manual data output:	Without stability, after stability, configurable printout
SBI: Automatic data output:	Without stability, at stability, at user-defined intervals
SBI: Output format:	16 or 22 characters
Printout of application data:	Output of a configurable printout

Analog UniCOM interface (optional)

Standard:	4 to 20 mA, 0 to 20 mA, 0 to 5V
Power supply:	Internal or external
Factory setting:	4 to 20 mA, internal power supply
Interface connector:	CISL1, CISL1N and CISL2 indicators (IP44 protection): 25-contact D-Sub female connector CIS1 and CIS2 indicators (IP67 protection): The free ends of the cable are connected to terminal screws inside the housing; the cable is routed into the housing via a cable gland.

[1] Optional UniCOM universal data interface
[2] XBPI operating mode: 9600 baud, 8 data bits, parity: odd, 1 stop bit
[3] Only with the standard COM1 interface
[4] Network address is valid only in the XBPI mode

Data Interfaces

Options for Connecting Peripherals
You can connect the following printers to the COM1 and UniCOM interfaces:
- YDP02 (user-definable interface parameters)
- YDP03 (user-definable interface parameters)
- YDP01IS (strip or label printer)
- YDP02IS (strip or label printer)
- YDP04IS (strip or label printer)
- Universal printer (user-definable transmission parameters)
- YAM01IS Alibi memory

The following devices can also be connected to the COM1 interface:
- Foot switch / hand switch
- PC (RS-232 interface)
- Second weighing instrument (Combics 2 only, RS-232 interface)
- External checkweighing display (red/yellow/green) over the digital I/O (Sartorius standard)

The connector of the UniCOM universal port enables the following devices to be connected:
- External rechargeable battery pack
- Bar code scanner (Combics 1 plus and Combics 2 only)

The following devices can also be connected to the UniCOM universal interface:
- PC (RS-232 interface)
- Second weighing instrument (Combics 2 only; can be switched from RS-232 to RS-485 operating mode)
- Second printer (external power source required)
- Remote display
- Current interface (0/4 - 20 mA)

⚠ If necessary, use an external power source to power peripheral devices.

Connecting a second weighing instrument:
Combics 2 enables connection of a second weighing instrument to either the COM1 or the UniCOM port.

COM1 operates in RS232 mode.
A second weighing instrument on this port can use the following operating modes:
- SBI
- XBPI-232 (factory setting)
- ADC-232

UniCOM can operate in either the RS-232 mode or in RS-485 mode.
A second weighing instrument on this port can use the following operating modes:
- SBI (RS-232 mode)
- XBPI-232 (RS-232 mode)
- ADC-232 (RS-232 mode)
- IS-485 (RS-485 mode, XBPI mode; factory setting)
- ADC-485 (RS-485 mode)

Connecting a Printer
The standard COM1 port or the optional universal UniCOM interface (or both) can be used as a printer interface.

Operation as a COM Port
For operation as a COM port, you can adapt the data protocol to the following operating modes:
- SBI (factory setting)
- XBPI-232
- XBPI-485 (only UniCOM)
- MP8-binary (only COM1)
- SMA

You can operate the COM1 port and the UniCOM port independently of one another (i.e., for transferring data and controlling equipment via a PC while simultaneously outputting data to the COM1 printer port).

In the SBI communication mode, you can control a display unit and a connected weighing instrument by sending ESC commands from a PC to the communications port (COM1 or UniCOM) (see page 96).

⚠ When using two interfaces (COM1 and UniCOM) each device can be configured only once. Devices are as follows:
- WP1-2
- Data communication
- External Alibi memory
- Analog output port

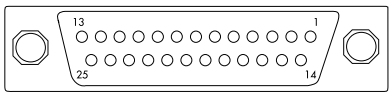
If you attempt to configure a device a second time (e.g., for the UniCOM port) after it has been configured another port (e.g., “Data communication” on COM1), error code INF 74 is displayed.

Pin Assignment Charts

Models CISL1, CISL1N and CISL2 (IP44-protected):

Female Connectors COM1 and UniCOM:

25-contact D-Submini DB25S with screw lock hardware



Front view

Male interface connector used (please use connectors with the same specifications):
25-pin D-Submini DB25, with integrated shielded cable clamp assembly (Amp type 826 985-1C) and fastening screws (Amp type 164868-1)

Pin assignments, COM1:

Pin 1: Shield
Pin 2: Data output (T×D)
Pin 3: Data input (R×D)
Pin 4: Not connected
Pin 5: Clear to send (CTS)
Pin 6: Internally connected
Pin 7: Internal ground (GND)
Pin 8: Internal ground (GND)
Pin 9: Not connected
Pin 10: Not connected
Pin 11: +12 V for printer
Pin 12: RES_OUT\
Pin 13: +5V
Pin 14: Internal ground (GND)
Pin 15: Universal remote switch
Pin 16: Control output “lighter”
Pin 17: Control output “equal”
Pin 18: Control output “heavier”
Pin 19: Control output “set”
Pin 20: Data terminal ready (DTR)
Pin 21: Supply ground (GND)
Pin 22: Not connected
Pin 23: Not connected
Pin 24: Power supply +15...25 V
Pin 25: +5V

Pin Assignment Chart: 2nd Interface:
Connection of external rechargeable battery and bar code scanner[1] (optional UniCOM interface not installed)

Pin 1: Shield
Pin 2: Not connected / *
Pin 3: Not connected / *
Pin 4: Internal ground (GND)
Pin 5: Not connected / *
Pin 6: Not connected / *
Pin 7: Not connected / *
Pin 8: Not connected / *
Pin 9: Not connected / *
Pin 10: Not connected / *
Pin 11: +12 V for printer
Pin 12: RES_OUT\
Pin 13: +5 V switch
Pin 14: Internal ground (GND)
Pin 15: Keyboard data
Pin 16: Not connected / *
Pin 17: Not connected / *
Pin 18: Not connected / *
Pin 19: Keyboard clock
Pin 20: Not connected / *
Pin 21: LINE_1 _GND
Pin 22: LOW_BATT [2]
Pin 23: BATT_ON_OFF [3]
Pin 24: LINE_1_B
Pin 25: +5V

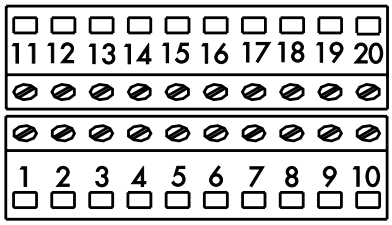
* Pin assignments depending on the UniCOM used
1) Combics 2 only
2) Signal from battery pack: battery drained
3) Switch off battery pack when weighing instrument switched off

Data Interfaces

Models CIS1, CISN1 and CIS2 (IP67-protected):

Connection of open cable ends to terminal screws inside the indicator

COM1 interface connections:

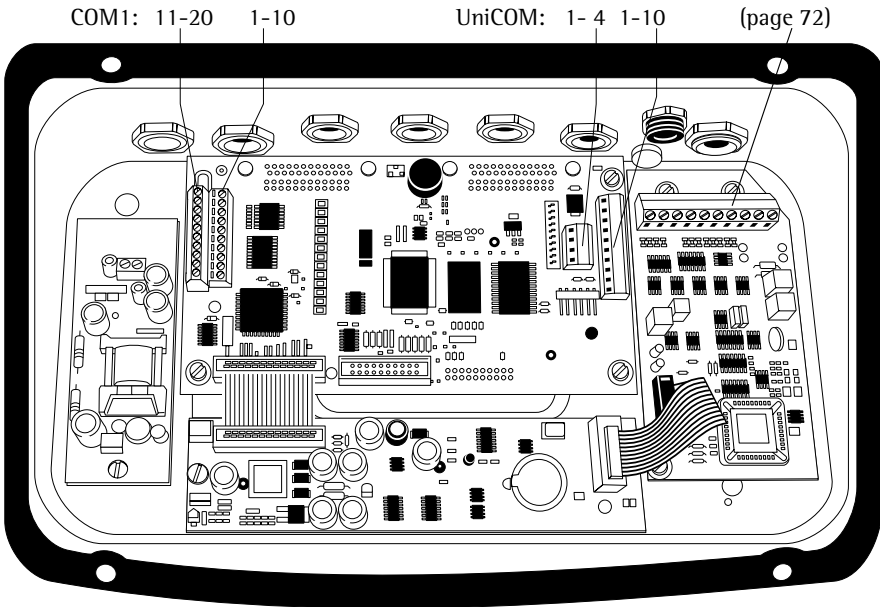


Top view

Terminal assignments

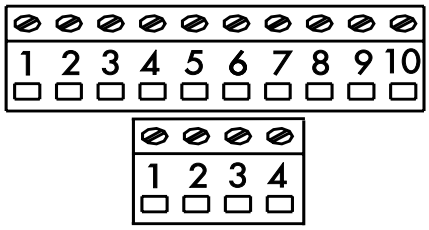
No. 1: Universal switch
No. 2: Control output “set”
No. 3: Control output “heavier”
No. 4: Control output “equal”
No. 5: Control output “lighter”
No. 6: Clear to send (CTS)
No. 7: Data output (T×D)
No. 8: Data input (R×D)
No. 9: Data terminal ready (DTR)
No. 10: Internal ground (GND)
No. 11: Supply +15 to 25 V
No. 12: Supply +15 to 25 V
No. 13: Supply ground (GND_LINE)
No. 14: Supply ground (GND_LINE)
No. 15: +12 V for printer
No. 16: Reset output
No. 17: +5 V
No. 18: +5 V
No. 19: Ground (GND)
No. 20: Ground (GND)

Models CIS1, CIS1N and CIS2: Terminals on the PCB



Connection of weighing instrument (page 72)

Second connection: For connecting an external battery pack and a bar code scanner [1] (optional UNICOM interface not installed)



Terminal assignments in the 10-terminal strip

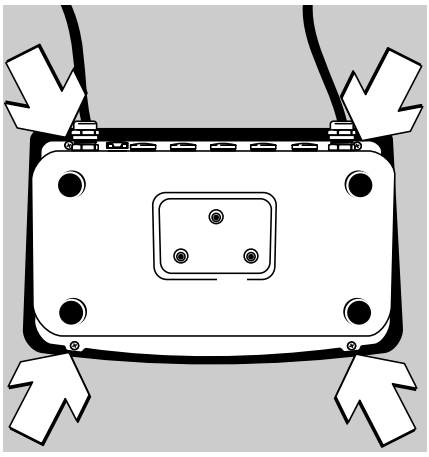
No. 1: Not connected*
No. 2: GND
No. 3: GND
No. 4: +5V Switch
No. 5: Not connected *
No. 6: Keyboard clock
No. 7: Keyboard data
No. 8: Not connected *
No. 9: Not connected *
No. 10: Not connected *

Terminal assignments in the 4-terminal strip

No. 1: Supply, ground (GND_LINE_B)
No. 2: Supply, battery pack
No. 3: LOW_BATT [2]
No. 4: BATT_ON_OFF [3]

* Pin assignments depending on the UniCOM used
[1] Combics 2 only
[2] Signal from battery pack: battery drained
[3] Switch off battery pack when weighing instrument switched off

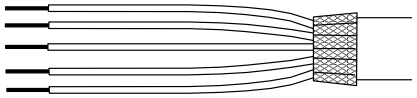
Installing the Interface Cable



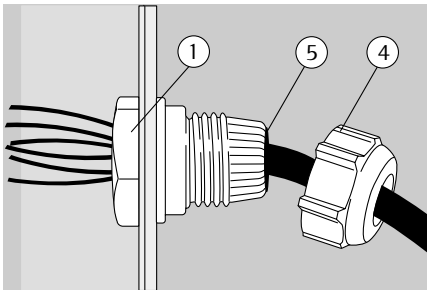
⚠ Peripheral devices should be connected to the interfaces only by a trained and authorized Sartorius technician. Any installation work that does not conform to the instructions in this manual will result in forfeiture of all claims under the manufacturer's warranty.

⚠ Disconnect the equipment from power (unplug from the wall socket) before beginning any installation work.

- Open the Combics indicator:
  remove the four cap nuts from the front panel and remove the panel.



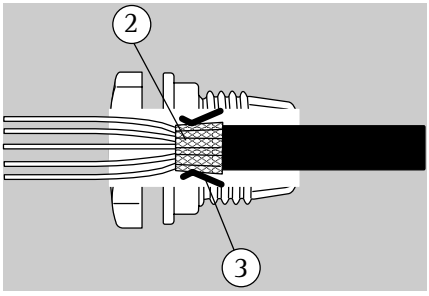
- Prepare the cable:
  - Expose approx. 10 cm (4 in) of the cable end for installation
  - Remove all but approx. 1 cm (½ in) of the shielding and fold it back over the casing
  - Strip the casing from approximately 1 cm (½ in) of the wires and attach ferrules to the wire ends.



- Attach the cable gland:

⚠ Please use extreme caution when performing any work on the equipment that affects this cable gland. Use a torque wrench and tighten the cable gland to 5 Nm.

  - Remove the protective cap from the bore hole on the indicator.
  - Guide the enclosed cable gland through the bore hole and secure it inside the housing with the nut (1).



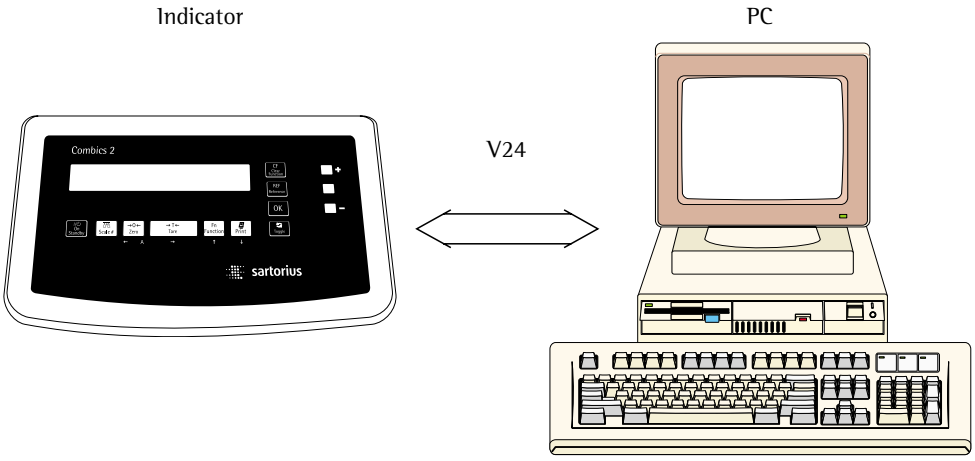
  - Slide the cable gland over the cable until the clamps (3) are in contact with the shield (2). Tighten the nut (4) until the sealing clamp (5) forms a slight ridge between nut and cable.
  - Make sure the shield is in contact with the clamps.

- Connect the wires securely in accordance with the terminal assignments.

- After you close the housing again, use a pressure gauge to check the integrity of the IP67-protection. For details, contact the Sartorius Service Center.

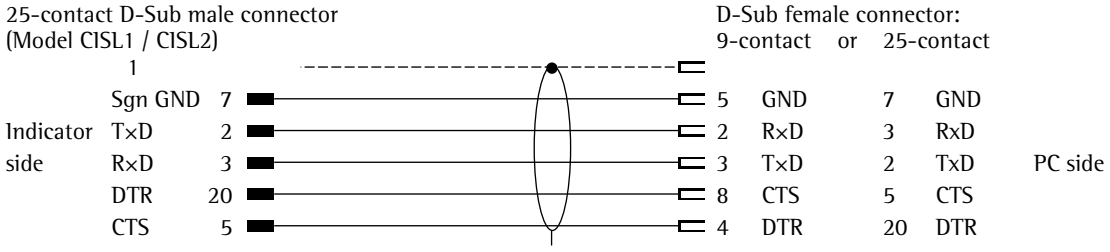
Cabling Diagram (Adapter Cable for PC)

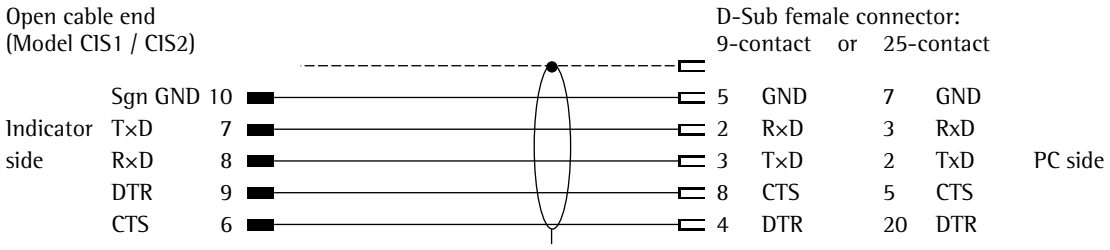
(Model CISL1/CISL1N/CISL2: adapter cable 7357312; model CIS1/CIS1N/CIS2: connecting cable YCC02-D9F6).
Diagram for connecting a computer or other peripheral device to the indicator using the RS-232-C/V24 standard and cables up to 15 m (50 ft.) long:



Cabling diagram

Connection assignments for the cable from the indicator to an RS-232 PC interface





Connecting the External Rechargeable Battery Pack (Accessory; Order No. YRB10Z)

● Installation:

⚠ Disconnect the equipment from power.
- CISL2 models: Connect a 25-pinD-Sub male connector (connecting cable YCC02-RB01) to the COM2 port
- CIS2 models: Connect an adapter cable in accordance with the wiring diagram (using the YCC02-RB02 cable or Option L2)

● Operation:

- Hours of operation: up to 40, depending on the weighing instrument connected; without options.
- The Combics automatically switches to battery operation in the event of a power outage. Once the mains supply is restored, the Combics automatically switches back to normal operation.

Battery Symbol

Battery fully charged: 

Battery drained: 

Connecting a Bar Code Scanner (Accessory; Order No. YBR02CISL)

● Installation:

⚠ Disconnect the equipment from power.
- CISL1N, CISL2 models: Connect a 25-pin D-Sub male connector to the COM2 interface. For simultaneous connection of a bar code scanner and an external rechargeable battery, use the YTC01 T-connector.
- CIS1N, CIS2 models: Connect an adapter cable in accordance with the wiring diagram (using the YCC02-RB02 cable or Option M8)

Synchronization

Data communication between the indicator and a computer takes the form of messages ("telegrams") made up of ASCII code. For error-free data communication, the settings for baud rate, parity, handshake mode and character format must be the same at both ends.

You can configure the interface settings in the Setup menu so that they match those of the computer. You can also define parameters in the indicator to make data output dependent on various conditions. The conditions that can be configured are listed in the descriptions of the application programs.

If you do not connect a peripheral device to the indicator's interface port, this will not generate an error message.

Handshake
The weighing instrument interface (Sartorius Balance Interface = SBI) has transmit and receive buffers. You can define the handshake parameter in the indicator's Setup menu:

- Hardware handshake (CTS/DTR)
- Software handshake (XON, XOFF)

Hardware Handshake
Hardware handshake with a 4-wire interface: 1 more character can be transmitted after CTS (clear-to-send).

Software Handshake
The software handshake is controlled via XON and XOFF. When a device switched on, XON must be transmitted to enable a connected device to communicate.

When the software handshake is configured in the Setup menu, the hardware handshake becomes active after the software handshake.

The data transmission sequence is as follows:

```
Scale      --- byte --->  Computer
(trans-    --- byte --->  (receiving
mitting    --- byte --->  device)
device)    --- byte --->
           <-- XOFF ---
           --- byte --->
           --- byte --->
              ...
            (Pause)
              ...
           <-- XON ---
           --- byte --->
           --- byte --->
           --- byte --->
           --- byte --->
```

Transmitting Device
Once XOFF has been received, it prevents further transmission of characters. When XON is received, it re-enables the transmitting device to send data.

Receiving Device
To prevent too many control commands from being received at one time, XON is not transmitted until the buffer is almost empty.

Configuring the Data Interface as a COM Port (dAtProt)

Configure the interface as a COM port in the Setup menu as a COM1 or UniCOM port under the "Data Protocol" (dAtProt) menu item.

SBI Communication
This is a simple ASCII interface. Data output is configured under menu items 6.1 and 6.3:

- Manual output of displayed value with or without stability (menu items 6.1.1 and 6.1.2)
- Automatic output of displayed value with or without stability (menu items 6.1.4 and 6.1.5) at intervals defined in display updates. The number of display updates comprising an output interval is configured under menu item 6.3.
- Output of a printout as configured in the Setup program (menu item 6.1.7). Output is linked to the "Data Protocol" menu item (dAtProt) (see page 100, "Configuring Printouts").

If you do not activate and configure a user-definable data record, the printout simply contains the current value displayed on the indicator (weight with unit, calculated value, alphanumeric display).

SMA Communication
Standardized communications protocol of the Scale Manufacturers Association

MP8 Binary
Purpose
With the MP8 interface you can connect MP8-generation peripheral devices with separate power supplies to the Combics indicator.
Features

- The weighing instrument is used only for determining weight values.
- The data interface transmits only in MP8 binary protocol
- The application program for MP8 can be selected under menu item 3
- The program index 2 for MP8 can be selected under menu item 4.
- "MP8 interface emulation" is not permitted in legal metrology.

Data Input Format

You can connect a computer to your indicator to send commands controlling weighing instrument functions and applications via the interface port.
All commands use the same format (data input format) starting with the ESC character (ASCII 27) and ending with a carriage return (CR; ASCII 13) and a line feed (LF; ASCII 10). The total length of a command is anywhere from 4 characters (1 command character between the start and end described above) to 7 characters (4 command characters).

The table below shows the available command characters; each command must be flanked by the start and end characters as described above.
Example: The command character for output is "P" ("output to Port").
The string "ESC P CR LF" triggers this command.

Command	Meaning
K	Weighing mode 1
L	Weighing mode 2
M	Weighing mode 3
N	Weighing mode 4
O	Block all keys
P	Output readout to data interface
Q	Output acoustic signal
R	Release (unblock) keys
T	Tare and zero (combination tare function)
f3_	Zero (see also the "kZE_" command)
f4_	Tare without zeroing (see also the "kT_" command
i_	Information about the indicator Example of output: "CI2/012502/1" Meaning: Indicator: Combics 2, software version: 012502, active weighing instrument: 1
kF1_	F1: Trigger [Fn] key function
kF2_	F2: [CF] key function (Combics 2 only)
kF3_	F3: [REF] key function (Combics 2 only)
kF4_	F4: [OK] key function (Combics 2 only)
kF5_	F5: [⇆] key function (Combics 2 only)
kF6_	F6: Trigger [Info] key function (Combics 1 plus only)
kF7_	F7: [ID1] key function (Combics 1 plus only)
kF8_	F8: [ID2] key function (Combics 1 plus only)
kCF_ (Combics 2 only)	CF: [CF] key function
kP_	[🖹] key function Output to printer port
kT_	[T] key function (tare)
kNW_	[⚖] key function (Toggle the weighing instrument)
kZE_	[→0←] key function (zero the instrument)
x1_	Output model designation of active weighing instrument. Example: "LP6200S-0C"
x2_	Output serial number of active weighing instrument; example: "0012345678 "
x3_	Output software version of active weighing instrument; example: " 00-20-04 "
x4_	Output software version of indicator; example: " 01-25-02 "
x9_	Output serial number of indicator; example: "0012345678 "
x10_	Output model of indicator; example: "CW2P4-1500RR-LCE"
z1_	Activate input for printout header 1
z2_	Activate input for printout header 2
txx...x_	xx...x: Input text Length acc. to input (Combics 1 plus only)

The ASCII code for the "underline" character is 95.

Format for entering printout header lines: ESC z x a ... a _ CR LF where x=(header line) 1 or 2; a ... a: a...a= up to 20 characters of text, followed by the "underline" character, carriage return and line feed.

Data Output Format

You can output the values displayed in the line for measured values and the weight unit with or without a data ID code.
The first 6 characters, called the data header, show the data ID code identifying the subsequent value. Select menu item 7.2 to define whether the data ID code is included in output or not.

Examples:

```
   +   235 pcs          Without data ID code
Qnt  +   235 pcs          With data ID code
```

Display segments that are not activated are output as spaces.
Values with no decimal point are output without a decimal point.

Data Output Format with 16 Characters (without Data Header)

Normal Operation

Position	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
	+	*	D	D	D	D	D	D	D	D	*	U	U	U	CR	LF
or	-	*	D	D	D	D	D	D	D	D	*	U	U	U	CR	LF
or	*	*	*	*	*	*	*	*	*	*	*	*	*	*	CR	LF

+-: Plus or minus sign
*: Space
D: Digit or letter (max. 7 characters plus decimal point)
U: Unit symbol (1 - 3 letters, followed by 0 - 2 spaces)
CR: Carriage return
LF: Line feed

Special Codes

Position	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
	*	*	*	*	*	*	–	–	*	*	*	*	*	*	CR	LF
or	*	*	*	*	*	*	H	*	*	*	*	*	*	*	CR	LF
or	*	*	*	*	*	*	H	H	*	*	*	*	*	*	CR	LF
or	*	*	*	*	*	*	L	*	*	*	*	*	*	*	CR	LF
or	*	*	*	*	*	*	L	L	*	*	*	*	*	*	CR	LF
or	*	*	*	*	*	*	C	*	*	*	*	*	*	*	CR	LF

*: Space
– –: Final readout mode
H: Overload
HH: Overload in Checkweighing
L: Underload
LL: Underload in Checkweighing
C: Calibration/adjustment

Error Codes

Position	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
	*	*	*	E	r	r	*	*	#	#	*	*	*	*	CR	LF
or	*	*	*	E	r	r	*	#	#	#	*	*	*	*	CR	LF

*: Space
#: Error code number (2 or 3 digits)

Example (output of value: +1255.7 g):

Position	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
	+	*	*	*	1	2	5	5	.	7	*	g	*	*	CR	LF

Position 1: Plus or minus sign or space
Position 2: Space
Positions 3-10: Weight value with decimal point; leading zeros are output as spaces.
Position 11: Space
Positions 12-14: Unit symbol or space
Position 15: Carriage return
Position 16: Line feed

Data Output Format with 22 Characters

Normal Operation

Position	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
	I	I	I	I	I	I	+	*	D	D	D	D	D	D	D	D	*	U	U	U	CR	LF
or	I	I	I	I	I	I	-	*	D	D	D	D	D	D	D	D	*	U	U	U	CR	LF
or	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	CR	LF

II: ID code character, right-justified with spaces
+-: Plus or minus sign
*: Space
D: Digit or letter (max. 7 characters plus decimal point)
U: Unit symbol (1 - 3 letters, followed by 0 - 2 spaces)
CR: Carriage return
LF: Line feed

Special Codes

Position	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
	S	t	a	t	*	*	*	*	*	*	*	*	–	–	*	*	*	*	*	*	CR	LF
or	S	t	a	t	*	*	*	*	*	*	*	*	H	*	*	*	*	*	*	*	CR	LF
or	S	t	a	t	*	*	*	*	*	*	*	*	H	H	*	*	*	*	*	*	CR	LF
or	S	t	a	t	*	*	*	*	*	*	*	*	L	*	*	*	*	*	*	*	CR	LF
or	S	t	a	t	*	*	*	*	*	*	*	*	L	L	*	*	*	*	*	*	CR	LF
or	S	t	a	t	*	*	*	*	*	*	*	*	C	*	*	*	*	*	*	*	CR	LF

**: Space
– –: Final readout mode
H: Overload
HH: Overload in Checkweighing
L: Underload
LL: Underload in Checkweighing
C: Calibration/adjustment

Error Codes

Position	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
	S	t	a	t	*	*	*	*	*	E	r	r	*	*	#	#	*	*	*	*	CR	LF
or	S	t	a	t	*	*	*	*	*	E	r	r	*	#	#	#	*	*	*	*	CR	LF

*: Space
#: Error code number (2 or 3 digits)

ID Code Characters

ID character	Meaning
G#	Gross value
N	Net value
T	Application tare memory 1
T2	Application tare memory 2
Diff	Difference from calibration value
Nom.	Exact calibration weight
Nom.	Exact calibration weight using SBI output
nRef	Reference sample quantity
pRef	Reference percentage
wRef	Reference sample weight
Qnt	Result from Counting application Result from Counting (piece count) and Neutral Measurement applications
mDef	Target value for Animal weighing
x-Net	Result from Animal Weighing
Setp	Target value for Checkweighing
W.Diff	Absolute difference (e.g., in kg) in Checkweighing
Lim	Deviation in % in Checkweighing
Max	Upper limit for Checkweighing
Min	Lower limit for Checkweighing
Stat	Status
Classx	Classification
Limx	Class limit
D	Percentage (as loss)
Prc	Percentage (as residue)
Wxx%	Reference percentage weight
Compxxx	Component xxx
Cont.T	Contents of the tare memory in Net-total Formulation
Tot. cp	Total weight in Net-Total Formulation
PT2	Preset tare
n	Transaction counter
*G	Sum of gross weights in Totalizing
*N	Sum of net weights in Totalizing
Ser.no	Serial number of the weighing instrument or indicator

Example (output of value: +1255.7 g):

Position	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
	G	#	*	*	*	*	+	*	*	*	1	2	5	5	.	7	*	g	*	*	CR	LF

Positions 1-6: ID code character, right-justified with spaces
Position 7: Plus or minus sign or space
Position 8: Space
Positions 9-16: Weight value with decimal point; leading zeros are output as spaces.
Position 17: Space
Positions 18-20: Unit symbol or space
Position 21: Carriage return
Position 22: Line feed

⚠ If the weight value is output with 10-fold increased resolution, this value is not permitted to be printed or saved in a weighing instrument operated in legal metrology in the SBI mode. In this case, the unit symbol is not included with output.

Configuring the Data Interface as a Printer Port (Pr IntEr)

You can connect one or two strip printers or one or two label printers to the Combics. Configure the COM1 and UniCOM interfaces as printer ports under the "Pr IntEr" menu item.

There are several actions that generate the command for outputting data to the printer port:

- Pressing the (F) key. If the operating menu is active, all menu settings under the active menu level are printed.
- On receipt of the SBI command "Esc k P _". For details, see "Data Input Format" in this chapter.
- In some applications, pressing a given key (e.g., to save a value or start a routine) also generates a print command. In this case, a configurable printout is generated with application-specific data.

The ⊙ ⏀ symbols are displayed when data is being output to the printer port.

Configuring Printouts

Configure printouts in the Setup menu is under the "Printouts" menu item (PrtProt). The printout should be formatted only after the desired application has been configured, as some of the positions are application-dependent. You can configure a different printout for each interface. Each printout contains your choice of the information blocks described in the following; to enable or disable a block in the printout, select it or deselect it in the Setup menu.
Combics 2 only: For the "Totalizing" and "Net-Total" applications, you can also configure summarized printouts (results) independent of individual component value printouts.

Block 1: Headers
You can define 2 headers, each with 20 characters per line (e.g., for printing your company's name).
Enter the header lines under menu items 7.4.1 and 7.4.2. Blank header lines are not printed.
Example: format of Block 1:

```
ACE HARDWARE
 GOETTINGEN
```

In this example, the company name is centered on the printout. This was achieved by entering blank spaces at the beginning of each line.

Block 2: Date/Time
(not on Combics 1)
Example: format of Block 2:

```
21.01.2001   16:02
```

To obtain a standardized time stamp (e.g., for documentation within a completely automated system), you can suppress the printout of the time stamp in the "Date / time" information block. This function is controlled under menu code 7 -12, "Time not printed". The factory setting is "Off" (i.e., the time is included on the printout). If you select "On" for this menu item, the time stamp can be inserted by a higher-level controller or central computer to maintain consistent time stamping. This setting is especially important for communication with a PC.

Separating Block:
Dotted line, blank line (for the Weighing application).
This block is automatically inserted before further information blocks are printed.

```
--------------------
```

Block 3: Initialization Data
Which data is included in this block depends on the active application.
It can include, for example, reference sample quantity, reference piece weight, target weight, etc. The block is terminated with a blank line.
This block can only by activated for the standard printout. It cannot be selected for the printout of results.
Example: format of Block 3 (Counting application)

```
nRef      10 pcs
wRef +  0.035 kg
```

Block 4: Serial Number
Example: format of Block 4:

```
Ser.no.  1234567890
```

Block 5: Results
Which data is included in this block depends on the active application.
Normally it includes gross, net and tare weights, followed by a blank line.
The result is printed after this data; for example, the piece count. The block is terminated with a blank line.
Example: format of Block 3 (Counting application)

```
G#   +  1.402 kg
T    +  0.200 kg
N    +  1.202 kg

Qnt       34 pcs
--------------------
```

GMP-compliant Printouts
When the corresponding menu item is active, the measured result is bracketed on the printout by a GMP header and a GMP footer (GMP = "Good Manufacturing Practice").
The GMP header precedes the first measured result. The GMP footer is printed either after each measured result ("ISO/GLP/GMP: For 1 application result," menu item 7.11.2), or after the last result in a series of measurements ("ISO/GMP/GLP: For several application results," menu item 7.11.3). To end a series of measured results, press and hold the [⌸] key (> 2 sec). In this case, the ⌸ symbol is displayed after the GMP header is printed and remains in the display until the GMP footer is printed.

If you toggle to a different weighing instrument (Combics 2 only) while a GMP printout of several measured results is being generated, the GMP footer for the weighing instrument used up to that point is generated when you press [⚖]. The GMP header for the other weighing instrument is included on the next printout generated.

A GMP-compliant printout is generated automatically at the conclusion of calibration/adjustment routines, as well as when you set or clear a preload.

If you use a label printer for GMP-compliant printouts and menu item 7.11.3 is active, the header and footer are printed on two different labels. To generate GMP-compliant printouts on labels, select menu item 7.11.2.

Three examples of GMP headers and one example of a footer are shown in the following. On Combics 1 models, the "date and time" line is not included.

Weighing platform WP1:

`--------------------`	Dotted line
`14.01.2002  09:43`	Date/time [1])
`Model  CISL2`	Combics model
`Ser.no.  12345678`	Combics serial no.
`Vers.  1.1007.12.1`	Software release for applications
`BVers.  01-25-01`	Software release for basic version
`--------------------`	Dotted line

Weighing platform WP2 (xBPI protocol): [2])

`--------------------`	Dotted line
`14.01.2002  09:45`	Date/time [1])
`Model  CISL2`	Combics model,
`Ser.no.  12345678`	Combics serial no.
`Vers.  1.1007.12.1`	Software release for applications
`BVers.  01-25-01`	Software release for basic version
`Type  IS12000S`	Platform model
`Ser.No.  12345678`	Platform serial no.
`--------------------`	Dotted line

Weighing platform WP2 (SBI protocol): [2])

`--------------------`	Dotted line
`14.01.2002  09:45`	Date/time [1])
`Model  CISL2`	Combics model
`Ser.no.  12345678`	Combics serial no.
`Vers.  1.1007.12.1`	Software release for applications
`BVers.  01-25-01`	Software release for basic version
`Type  SBI`	(Platform model)
`--------------------`	Dotted line

GMP footer:

`--------------------`	Dotted line
`14.01.2002  09:45`	Date/time [1])
`Name:`	Field for operator signature
	Blank line
`--------------------`	Dotted line

[1]) Not applicable for Combics 1 indicators
[2]) Combics 2 indicators only

Sample Printouts

For details on the individual information blocks, see “Configuring Printouts” above. For details on configuring the header lines, refer to the chapter describing the particular application.

Weighing Application
There is no data for the “initialization data” block. If this block is enabled for the printout, a blank line is output.

```
    HEADER LINE 1
    HEADER LINE 2

14.01.2002      09:43
--------------------

G#      +     1.402 kg
T       +     0.200 kg
N       +     1.202 kg
--------------------
```

With weighing instrument serial number:

```
Ser.no.       80705337

G#      +     1.402 kg
T       +     0.200 kg
N       +     1.202 kg
--------------------
```

Counting Application
The “Initialization data” block contains the reference sample quantity and reference piece weight. The ”Results” block contains gross, net and tare weights, as well as the calculated piece count.

```
--------------------
nRef             10 pcs
wRef   +     0.035 kg

G#      +     1.402 kg
T       +     0.212 kg
N       +     1.190 kg

Qnt              34 pcs
--------------------
```

Neutral Measurement Application
The “Initialization data” block contains the reference sample quantity and reference weight. The “Results” block contains gross, net and tare weights, as well as the calculated piece count.

```
Ref               2 o
wRef   +     1.200 kg

G#      +    14.700 kg
T       +     0.300 kg
N       +    14.400 kg

Qnt              12 o
--------------------
```

Weighing in Percent Application
The “Initialization data” block contains the reference percentage and reference weight. The results block shows gross, net and tare weights, as well as the percentage, which is shown as either the loss or the residual amount.

Percentage = residue:

```
--------------------
pRef            100 %
Wxx%   +     2.100 kg

G#      +     1.859 kg
T       +     0.200 kg
N       +     1.659 kg

Prc              79 %
--------------------
```

Percentage = loss:

```
--------------------
pRef            100 %
Wxx%   +     2.100 kg

G#      +     0.641 kg
T       +     0.200 kg
N       +     0.441 kg

D                21 %
--------------------
```

Checkweighing Application
The “Initialization data” block contains the nominal, minimum and maximum weights. The “Results” block always contains the gross, net and tare weights. The other results can be displayed in one of two ways:

- Result = Weight:
  The deviation from the nominal weight is given both as a percentage and as an absolute (weight) value, whether the result lies within the tolerance limits or not.
- Result = Threshold status:
  If the result lies within the tolerance limits, the printout shows the deviation from the nominal weight both as a percentage and as an absolute (weight) value, just as in the “Weight” printout mode described above.
  If the result is outside the tolerance limits, the last line of the printout indicates the status as follows:

  Result in “OK” range; “Weight” or “Threshold” printout:

```
--------------------
Setp   +     1.300 kg
Min    +     1.235 kg
Max    +     1.365 kg

G#      +     1.312 kg
T       +     0.000 kg
N       +     1.312 kg

Lim    +      0.92 %
W.Diff+      0.012 kg
--------------------
```

  Result outside (over) the “OK” range; “Threshold” printout:

```
--------------------
Setp   +     1.300 kg
Min    +     1.235 kg
Max    +     1.365 kg

G#      +     1.400 kg
T       +     0.000 kg
N       +     1.400 kg

Stat       HH
--------------------
```

Classification Application
The "Initialization data" block contains the upper limits of Classes 1 through 4. The "Results" block contains gross, net and tare weights, as well as the class that the sample belongs to (1 through 5, where Class 5 means that the upper limit of Class 4 was exceeded).

```
--------------------
Lim1   +    10.000 kg
Lim2   +    11.000 kg
Lim3   +    12.000 kg
Lim4   +    13.000 kg

G#     +     9.700 kg
T      +     0.000 kg
N      +     9.700 kg

Class              1
--------------------
```

Animal Weighing Application
The "Initialization data" block contains the number of measured values that averaging is based on. The "Results" block contains the tare weight and the mean value.

```
--------------------
mDef               8

T      +     0.000 kg
x-Net  +     4.202 kg
--------------------
```

Net-Total Formulation Application
The "Initialization data" block is empty. If this block is enabled for the printout, a blank line is output.
Which data is contained in the "Results" block value depends on the program operating status at the time of printing. The following options are available:
- Total/results printout
  After [CF] is pressed
  (tare memory is cleared)
- Individual/components printout
  After [OK] is pressed
  (component is stored in tare memory)
- Standard
  After [⎙] is pressed (component is not stored in tare memory)

"Total" printout:

```
--------------------
n                  3
S-Comp+     3.400 kg
Cont.T+     0.200 kg
--------------------
```

Component printout (menu item 3.17.3)
When the components printout is configured, the header is printed only once, followed by all components.
If you are using a label printer, make sure a single label is large enough for the list of all components. For printer models YDP01IS and YDP04IS, you can configure manual form feed in the operating menu. If the corresponding setting is active, you can activate "form feed" manually. With the YDP02IS printer, form feed is automatic after each print command (fixed setting).
Example with 2 components

```
   HEADER LINE 1
   HEADER LINE 2
14.01.2002      09:43
--------------------
Cmp001+     1.200 kg

Cmp002+     2.000 kg
```

Component printout
(menu item 3.17.2)
The entire standard printout is generated for each component.
Example for the second component:

```
   HEADER LINE 1
   HEADER LINE 2
14.01.2002      09:46
--------------------
Cmp002+     2.000 kg
```

Standard printout
Example before the 2nd component is stored:

```
G#     +     4.400 kg
T      +     0.200 kg
T2     +     4.200 kg
N      +     0.000 kg
```

Totalizing Application
The "Initialization data" block is empty. If this block is enabled for the printout, a blank line is output.
Which data is contained in the "Results" block value depends on the program operating status at the time of printing. The following options are available:
- Printout of results
  After [CF] is pressed
  (totalizing memory is cleared)
- Individual/component printout of one transaction
  After [OK] is pressed
  (component is stored in tare memory)
- Standard printout
  After [⎙] is pressed (component is not stored in tare memory)

"Total" printout:

```
--------------------

*G           9.200 kg
*N     +     8.600 kg
n                  3
--------------------
```

Component printout (menu item 3.17.3)
The header is printed only once, all transaction are printed one after the other. For printing on a label printer, see also "Component printout, Net-Total."
Example with 2 transactions:

```
   HEADER LINE 1
   HEADER LINE 2
14.01.2002      09:43
--------------------
G#     +     1.400 kg
T      +     0.200 kg
N      +     1.200 kg
n                  1

G#     +     3.400 kg
T      +     0.200 kg
N      +     3.200 kg
n                  2
```

Component printout
(menu item 3.17.2)
The entire standard printout is generated for each component.
Example: 2. Print second transaction:

```
   HEADER LINE 1
   HEADER LINE 2
14.01.2002     09:43
--------------------
G#     +     2.400 kg
T      +     0.200 kg
N      +     2.200 kg
n                2
```

Standard printout
The transaction counter value is not printed.
Example: 2. Print second transaction:

```
G#     +     2.400 kg
T      +     0.200 kg
N      +     2.200 kg
```

Print menu parameters:
All active menu item settings below the active menu level are printed.

```
--------------------
MENU
       SETUP.
WP1
--------------------
  1
   1.1
              1.1.2
              1.2.1
              1.3.2
...

  1.18
   1.18.1
    CAL
          10.000 kg
```

etc.

GMP-compliant Printouts
Linearization record:

```
--------------------
14.01.2002     13:00
Model           CISL2
Ser.no.      12345678
Vers.    1.1007.12.1
BVers.       01-25-01
--------------------

Linearization
Wt.1 +       7.00 kg
Wt.2 +      15.00 kg
Wt.3 +      22.00 kg
Wt.4 +      30.00 kg
        completed
--------------------
14.01.2002     13:02
Name:

--------------------
```

Calibration/adjustment record:

```
--------------------
14.01.2002     13:50
Model           CISL2
Ser.no.      12345678
Vers.    1.1007.12.1
BVers.       01-25-01
--------------------

External calibration
Nom.  +    30.000 kg
Diff. -     0.003 kg
External adjustment
Diff. +     0.000 kg
--------------------
14.01.2002     13:52
Name:

--------------------
```

“Set preload” record:

```
--------------------
14.01.2002     13:50
Model           CISL2
Ser.no.      12345678
Vers.    1.1007.12.1
BVers.       01-25-01
--------------------

Set preload
            completed
--------------------
14.01.2002     13:52
Name:

--------------------
```

“Clear preload” record:

```
--------------------
14.01.2002     13:50
Model           CISL2
Ser.no.      12345678
Vers.    1.1007.12.1
BVers.       01-25-01
--------------------

Clear preload
            completed
--------------------
14.01.2002     13:52
Name:

--------------------
```

Weighing printout with multiple results; example with 2 results:

```
--------------------
14.01.2002     09:43
Model           CISL2
Ser.no.      12345678
Vers.    1.1007.12.1
BVers.       01-25-01
--------------------

   HEADER LINE 1
   HEADER LINE 2
14.01.2002     09:43
--------------------
G#     +      2.40 kg
T      +      0.20 kg
N      +      2.20 kg
--------------------
   HEADER LINE 1
   HEADER LINE 2
14.01.2002     09:44
--------------------
G#     +      3.40 kg
T      +      0.30 kg
N      +      3.10 kg
--------------------
14.01.2002     09:45
Name:

--------------------
```

Error Codes

Error codes are shown on the main display. There are three types of error:

- Dynamic errors are indicated until the error is corrected, by an error code (e.g. inF 01).
- Temporary errors are indicated for 2 seconds (e.g., inF 07)
- "Fatal" errors are displayed continuously (e.g., Err 101) until the indicator is switched off and back on again.

Error Code	Cause	Solution
No display segments shown	No power connection	Check power supply
-------	Key pressed is not currently available	
H	Weighing capacity exceeded	Unload the weighing instrument
L or Err 54	Load plate/weighing pan is not on the weighing instrument	Place the load plate/weighing pan on the weighing instrument
Err 101 - 104	Key is stuck Key pressed when switching on the Combics	Release key or Contact your local Sartorius Service Center
Err 320	Operating program memory (EEPROM) defective	Contact your local Sartorius Service Center
Err 335	Verified platform not compatible with terminal	Connect a compatible weighing platform
Err 340	Operating parameter (EEPROM) error	Turn the weighing instrument off, then back on again. If this error code remains displayed, please contact your local Sartorius Service Center
Err 341	Data lost from RAM, battery needs to be recharged	Leave the weighing instrument power on for at least 10 hrs.
Err 343	Loss of data in the memory area for transaction numbers in external Alibi memory modules	Contact your local Sartorius Service Center
inF 01	Data output not compatible with output format	Change the configuration in the Setup menu
inF 02	Calibration/adjustment condition not met, e.g., – the weighing instrument was not tared – the weighing instrument is loaded	Calibrate only when zero is displayed Press →T← to tare Unload the weighing instrument
inF 03	Calibration/adjustment could not be completed within a certain time	Allow the weighing instrument to warm up again and repeat the adjustment process
inF 06	Internal calibration weight defective	Contact your local Sartorius Service Center
inF 07	Function not allowed in weighing instruments verified for use in legal metrology	Contact your local Sartorius Service Center for information on having the settings changed
inF 08	The load on the weighing instrument is too heavy to zero the readout	Check whether "tare/zero with power on" is set (1.12)
inF 09	Taring is not possible when the gross weight is < zero	Zero the weighing instrument
inF 10	Tare key is blocked when there is data in the tare memory	The data stored for the application program (Combics 2 only) must be deleted (clear the memory) before taring.
inF 18	Preload is too light	
inF 19	Preload is too heavy	
inF 29	Minimum load not reached	Define a lower value for the minimum load (in the Application settings, under 3.6)
inF 30	BPI ID (BPI byte) in active weighing instrument not deleted (cannot deactivate XBPI mode in COM1)	Restore factory settings for device parameters in the active weighing instrument
inF 31	Interface handshake not completed	Send XON, CTS
inF 71	Cannot store the current weight value (e.g., if control limits are too low or too high)	None
inF 72	Cannot store the current weight value (e.g., the transaction counter has reached its limit)	None
inF 73	Data not found or unreadable	Contact your local Sartorius Service Center
inF 74	Function is blocked (e.g., menu is locked)	None
noIP	No weighing platform connected	Connect weighing platform

Care and Maintenance

Service
Regular servicing by a Sartorius technician will extend the service life of your Combics indicator and ensure its continued weighing accuracy. Sartorius can offer you service contracts, with your choice of regular maintenance intervals ranging from 1 month to 2 years.

The optimum maintenance interval depends on the operating conditions at the place of installation and on the individual tolerance requirements.

Repairs
⚠ Disconnect defective equipment from power immediately (unplug the equipment from the wall outlet (mains supply)). Repairs may be performed only by authorized Sartorius service technicians using original Sartorius parts. Repairs performed by untrained persons may result in considerable hazards for the user.
Important Note: If the equipment is still under warranty, send the entire indicator to the factory for repairs.

⚠ If a cable or cable gland is damaged or defective, replace the cable as a complete unit with all its connectors.

⚠ Do not open the indicator while it is carrying current. Allow at least 10 seconds to elapse after disconnecting the equipment from power before opening the equipment housing.
Proper fitting of all surfaces is essential for the IP rating of the housing; for this reason the device must be opened and closed by a certified technician.

Cleaning
The indicators are designed in compliance with European Hygienic Equipment Design Group (EHEDG) directives for contamination prevention, which means they are particularly easy to clean and disinfect.

⚠ Disconnect the indicator from power (unplug the from the wall outlet (mains supply) and disconnect any data cables.

⚠ Make sure that no dust or liquid enters the indicator housing.

⚠ Do not use any aggressive cleaning agents (solvents or similar agents).

⚠ Do not wash down the equipment with water or dry it with compressed air; this is not permitted.

● Clean the indicator using a piece of cloth which has been wet with a mild detergent (soap).

○ If used in the food industry, use a cleaning agent suitable for the particular working environment.

● After cleaning, wipe down the indicator with a soft, dry cloth.

Cleaning Stainless Steel Surfaces
Clean all stainless steel parts regularly. Use a damp cloth or sponge to clean stainless steel parts on the weighing instrument. You can use any household cleaning agent that is suitable for use on stainless steel. Clean stainless steel surfaces by wiping them down. Then rinse the equipment thoroughly, making sure to remove all residues. Afterwards, allow the equipment to dry. If desired, you can apply oil to the cleaned surfaces as additional protection.

Solvents are permitted for use only on stainless steel parts.

Replacing the Dust Cover
> Replace damaged dust covers.

● Place the new dust cover on the indicator and press down on the front and back along the edges until the cover is firmly seated.

Safety Inspection
Safe operation of the device is no longer ensured when:

- there is visible damage to the device or power cord
- the built-in power supply no longer functions properly
- the device has been stored for a relatively long period under unfavorable conditions (e.g., extreme moisture)

If there is any indication that safe operation of the device is no longer warranted:

● Disconnect the equipment from power (unplug the equipment from the wall outlet (mains supply) and lock it in a safe place to ensure that it cannot be used.

● Notify your nearest Sartorius Service Center or the International Technical Support Unit based in Goettingen, Germany.

Maintenance and repair work may be performed only by authorized Sartorius service technicians who:

- have access to the required service and maintenance manuals, and
- have attended the relevant service training courses.

⚠ The seals affixed to this equipment indicate that the equipment may be opened only by authorized service technicians, to ensure safe and trouble-free operation of the equipment and to maintain the conditions for warranty coverage.

Recycling

Sartorius products are packaged to ensure safe shipment using environmentally friendly materials. After successful installation of the indicator, you should return this packaging for recycling because it is a valuable source of secondary raw material.

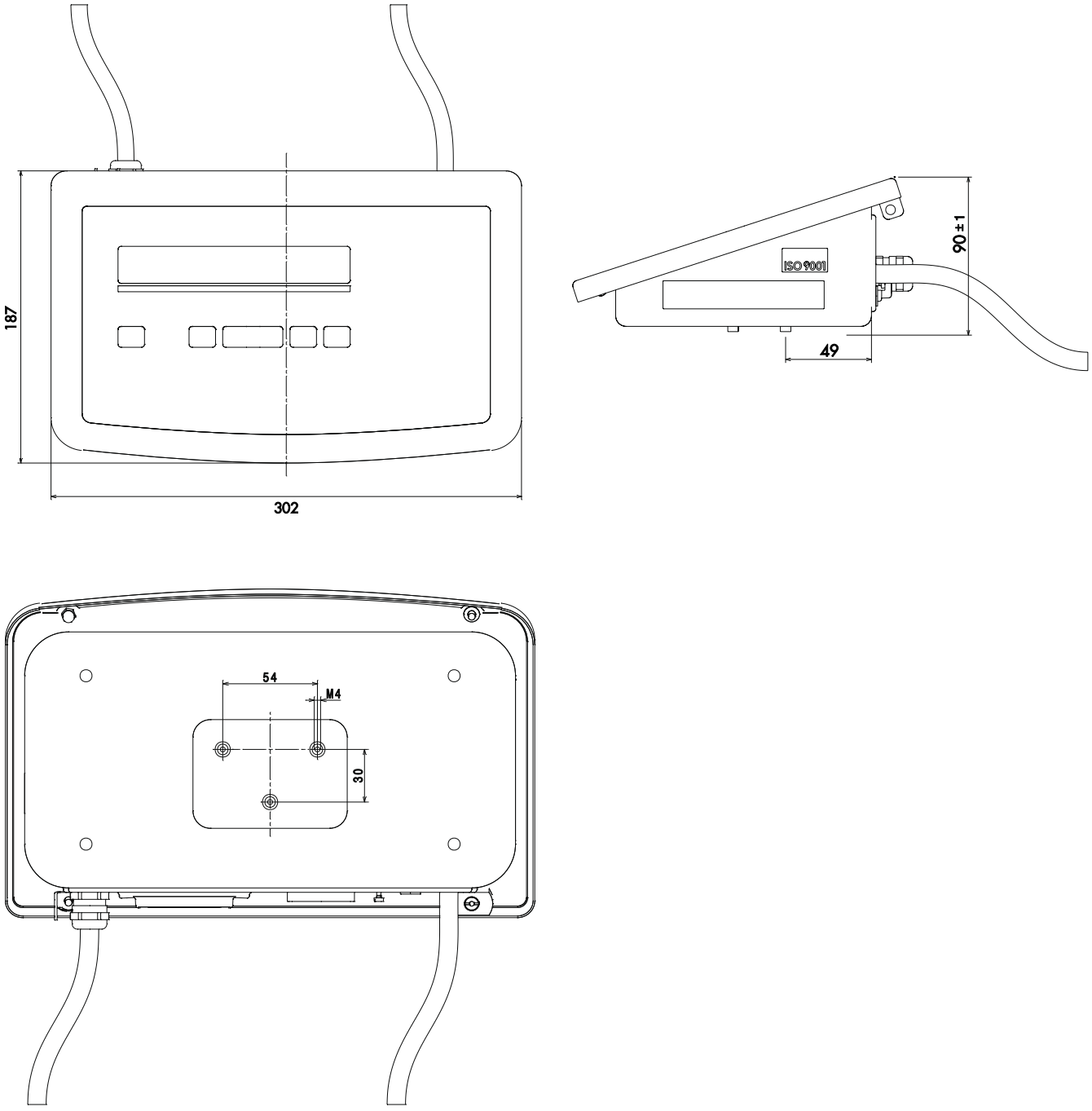
For information on recycling options, including recycling of old weighing equipment, contact your municipal waste disposal center or local recycling depot.

If the equipment contains batteries, make sure to remove them before disposal.
Batteries are hazardous waste and must be disposed of separately. Contact your municipal waste disposal center or local recycling depot for details on the proper disposal of batteries.

Specifications

When used in standard applications (as opposed to legal metrology):	
– Display resolution	≤31,250 d
In legal metrology:	
Accuracy class	(III), (IIII)
Verification scale intervals when used as a	
– Single-range instrument	≤3125 e
– Multi-interval instrument	≤3125 e
– Maximum e1	6250 e
– Multiple-range instrument	£3125 e
Load cell connection:	
– Supply voltage	9 V (±4.5 V)
– Bridge impedance	83 Ω to 2000 Ω
– Available sensor technology	4-conductor or 6-conductor technology
When used in legal metrology:	
– Available sensor technology	6-conductor technology
– Max. cable length per gauge	150 m/mm2
– Lowest permissible input signal	
for P_{ind} = 0.5	≥0.720 µV/e
for P_{ind} = 0.3	≥1.200 µV/e
– Fraction of tolerance for this module:	
for Delta U_{min} ≥ 0.720 µV/e	0.5
for Delta U_{min} ≥ 1.200 µV/e	0.3
Performance specifications of the built-in A/D converter:	
Weighing capacity	Up to 32 t
Measuring signal	0.45 mV to 36 mV
Measuring signal for preload (dead load)	0.45 mV to 6.3 mV
Measuring signal variation	4.5 mV to 29.7 mV
Sensitivity	Max. 4 million digits (internal)
Digital protective interface	acc. to EN45501
Data interface	Bi-directional RS-232 interface with control outputs (5V, TTL standard) (standard equipment)
Additional data interface	optional
Display	20 mm LCD, 7-segment plus status indicators, backlit;
Housing:	
– Material	AISI 304 stainless steel
– Dust and water protection acc. to EN60529	CISL1, CISL1N, CISL2: IP44 (IP65 optional) CIS1, CIS1N, CIS2: IP67
Operating temperature range	-10°C to +40°C (+14°F to +104°F)
Power supply	100-240 VAC (-15/+10%), 50-60Hz, max. 17W / 23 VA optional: 15.5-24 VDC (±10%), max. 12 W optional: 13-17 VAC (±10%), 50-60 Hz, max. 12 W Optional battery pack: YBR10Z
Emissions	Acc. to EN61326+A1 Class B (IEC 61326+A1)
Immunity to interference	Acc. to EN61326+A1, industrial areas (IEC 61326+A1)
Electrical safety	Acc. to EN61010-1 (EC 1010-1), EN60950 (IEC 950)

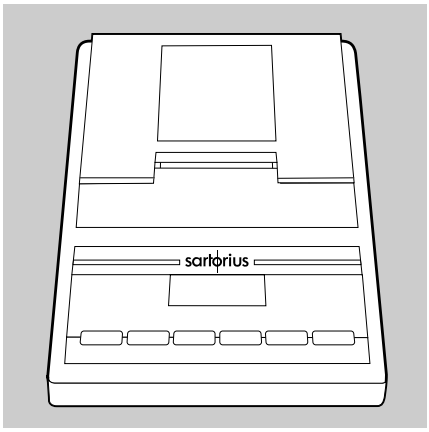
Dimensions (Scale Drawings)



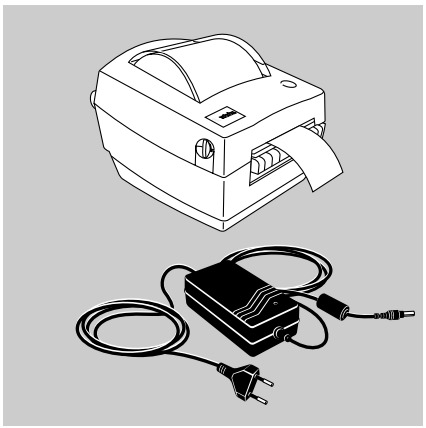
All dimensions are given in millimeters

Accessories/Options

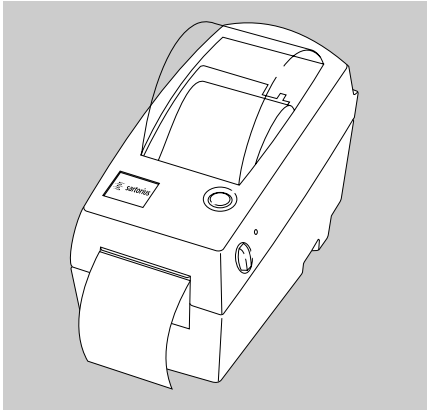
Product	Order No.
Dust covers (2 pcs)	YDC01CI
Interface module (RS-232) for UniCOM	YDO01C-232
Interface module (RS-485/RS-422) for UniCOM	YDO01C-485
Profibus-DP module for UniCOM interface	YDO01C-DP
Bluetooth® interface module with antenna outside the housing	YDO01C-BT
Analog current output, 0-20 mA, 4-20 mA, 0-10 V, 16-bit*	YDA01C-20MA
Verifiable printer with functions for date, time and statistical evaluations; LC display.	YDP03-0CE
– Printer paper (5 rolls; length per roll: 50 m)	6906937
– Replacement ink ribbon cartridge for printer	6906918



Verifiable strip and label printer with thermal print head, paper width 101 mm, with adapter cable (12-pin round male connector) and external power supply. Sartorius “NICE Label Express” software required for putting the printer into operation. Adapter cable YCC01-01CISLM3 required for Combics model CISL indicator. Adapter cable YCC02-R12F6 required for Combics model CIS indicator.	YDP12IS-0CE-UV
– Printer paper (1 roll) for YDP12IS printer, 101 mm × 75 m, thermo paper	69Y03196
– Labels for YDP12IS printer, extra large, 101 × 75 mm; 305 labels	69Y03195



Verifiable strip and label printer with thermal print head, paper width 60 mm, with adapter cable (12-pin round male connector) and external power supply. Adapter cable YCC01-01CISLM3 required for Combics model CISL indicator. Adapter cable YCC02-R12F6 required for Combics model CIS indicator.	YDP04IS-0CE-UV
– Printer paper (3 rolls) for YDP02/04IS, 60 mm × 75 mm, thermo paper	69Y03090
– Labels for YDP02/04IS, small, 58 × 30 mm; 1000 labels	69Y03092
– Labels for YDP02/04IS, medium, 58 mm × 76 mm; 500 labels	69Y03093
– Labels for YDP02/04IS, large, 58 × 100 mm; 350 labels	69Y03094
Cable for direct connection of YDP02IS/YDP04IS printer to Combics model CISL indicator	YCC01-01CISLM3



* not for use in legal metrology

Product	Order No.
External rechargeable battery pack, up to 40 h operation, incl. charger	YRB10Z
External red/green/red display for Combics model CISL indicators	YRD11Z
Second display for Combics model CISL indicators *	YRD02Z
Remote display, 7-segment, up to 45 mm character size *	Information on request
Bar code scanner, 120 mm scanning width, with cable forconnection to Combics 2	
– for Combics model CISL indicators	YRB02CISL
– with adapter cable YCC02-R12F6 for Combics model CIS indicators	YBR02FC
Foot switch, incl. D-Sub 25-pin T-connector	YFS01
Hand switch, incl. D-Sub 25-pin T-connector	YHS02
External Alibi memory for electronic storage of weighing data	YAM01IS
Scanner for loading weighing data in a PC from YAM13IS card	YAM02IS
Power supply for YAM01IS or YAM02IS	YAM11IS
Memory card for YAM01IS	YAM13IS
Cable for connecting Combics indicator to YAM01IS Alibi memory	YCC01-10CIM3
Cable (D-Sub 9-pin) for connecting YAM01IS Alibi memory to a PC	69EM0012
Flow control for pumps with analog or pulse interface	YFC02Z-V2
Flexible formatting options for printouts (e.g., for bar codes with variable font size, graphics, etc.)	Information on request
Sartorius WinScale driver software for Windows 95/98/2000/NT. Displays the weighing instrument readout on your PC monitor and provides secure memory for storing data that is subject to legal control. YCC01-09ISM5 RS-232 connecting cable required (RS-485 cable available on request).	YSW03
SartoConnect data transfer software (for loading weight values in a PC running Windows 95/98/NT and processing with application program such as MS Excel, Access, etc.) incl. adapter cable (1.5 m) from weighing instrument to PC (12-pin to 9-pin)	YSC01I
Installation kit for installing the Combics in a pit (with separable connection to indicator)	YAS99I
IP65 Upgrade Kit for IP44-protected Combics model CISL indicators	YAS01CISL
Retainer for wall mounting; stainless steel	YDH02CIS
Floor-mounted column	YDH03CIP
Floor-mounted column; stainless steel	YDH03CIS
Base for installing the floor-mounted column	YBP03CIP
Base for installing the floor-mounted column; stainless steel	YBP03CIS

* not for use in legal metrology

Product	Order No.
Retainer for mounting bar code scanner on floor-mounted column, bench stand or column of Combics complete scale	YBH01CWS
Plate for mounting printer on the floor-mounted column or bench stand	YPP01CWS
Set of castors for YBP03CIP/S column base, with 2 guide castors, 2 lockable castors	YRO03CI
Anti-theft locking device	YTP01CI
24V industrial power supply module*	YAS02CI
Connecting cable (25-contact D-Sub) for YRB10Z battery pack (2 m)	YCC02-RB01
Connecting cable with cable gland, for YRB10Z rechargeable battery pack (2 m) (Combics CIS models only)	YCC02-RB02
Connecting cable with cable gland for car battery (2 m) (Combics CIS models only)	YCC02-CB02
Connecting cable with cable gland for YBR02FC bar code scanner (Combics CIS models only)	YCC02-BR02
Connecting cable with cable gland, 9-pin D-Sub male connector, 6 m (Combics CIS models only)	YCC02-D09M6
Connecting cable with cable gland, 9-contact D-Sub female connector, 6 m (Combics CIS models only)	YCC02-D09F6
Connecting cable with cable gland, 25-contact D-Sub female connector, 6 m (Combics CIS models only)	YCC02-D25F6
Connecting cable with cable gland, 12-pin round male connector, 6 m (Combics CIS models only)	YCC02-R12M6
Connecting cable with cable gland, 12-contact round female connector, 6 m (Combics CIS models only)	YCC02-R12F6
Cable for YDA01C-20MA current interface, with open cable ends; for example, 5× = 5 m *	6906926
Cable gland for Combics model CIS, IP65/67 (Combics CIS models only)	YAS04CIS

Connecting an IS Weighing Platform to a Combics 2 Indicator
You can connect an IS weighing platform for use as WP2.

Features:
- IS weighing platforms process weighing data independently of the indicator.
- IS weighing platforms can be internally calibrated/adjusted.
- IS...-0CE models have a separate approval number, printed on a tag that is affixed to the cable.
- Please observe the conditions described in the manual for the weighing platform you connect.

* not for use in legal metrology

Declaration of Conformity

CE Marking on Sartorius Equipment
In 1985, the Council of the European Community approved a resolution concerning a new approach to the technical harmonization and standardization of national regulations. The organization for monitoring compliance with the directives and standards concerning the CE marking is governed in the individual EU Member States through the implementation of the EC Directives adopted by the respective national laws. As of December 1993, the scope of validity for all EC Directives has been extended to the Member States of the European Union and the Signatories of the Agreement on the European Economic Area.
Sartorius complies with the EC Directives and European Standards in order to supply its customers with weighing instruments and related equipment that feature the latest technology and provide many years of trouble-free service.
The CE marking may be affixed only to weighing instruments and associated equipment that comply with the following Directives:
Council Directive 89/336/EEC
"Electromagnetic compatibility (EMC)"
Applicable European Standards

1. Electromagnetic compatibilty

1.1 Reference to 89/336/EEC:
Official Journal of the European Communities, No. 2001/C 105/03

EN 61326-1	Electrical equipment for measurement, control and laboratory use EMC requirements
Part 1:	General requirements Defined immunity to interference: Industrial areas, continuous, un-monitored operation Limitation of emissions: Residential areas, Class B

Important Note:
The operator shall be responsible for any modifications to Sartorius equipment and for any connections of cables or equipment not supplied by Sartorius and must check and, if necessary, correct these modifications and connections. On request, Sartorius will provide information on the minimum operating specifications (in accordance with the Standards listed above for defined immunity to interference).

Council Directive 73/23/EEC "Electrical equipment designed for use within certain voltage limits"
Applicable European Standards:

EN 60950	Safety of information technology equipment including electrical business equipment
EN 61010	Safety requirements for electrical equipment for measurement, control and laboratory use
Part 1:	General requirements

If you use electrical equipment in installations and under ambient conditions requiring higher safety standards, you must comply with the provisions as specified in the applicable regulations for installation in your country.

Weighing Instruments for Use in Legal Metrology:
Council Directive 90/384/EEC
"Non-automatic weighing instruments"
This Directive regulates the determination of mass in legal metrology.
For the respective Declaration of Type Conformity for Sartorius weighing instruments verified for use as legal measuring instruments that have an EC Type-approval Certificate, see the instruction manual(s) for each weighing instrument connected or refer to the enclosed "Guide to Verification."
This Directive also regulates the performance of the EC verification by the manufacturer, provided that an EC Type-approval Certificate has been issued and the manufacturer has been accredited by an officer of a Notified Body registered at the Commission of the European Community for performing such verification.
Sartorius complies with EC Directive No. 90/384/EEC for non-automatic weighing instruments, which has been in effect since January 1, 1993, within the Single European Market, as well as the accreditation of the Quality Management System of Sartorius AG by Lower Saxony's Regional Administrative Department of Legal Metrology (Niedersächsische Landesverwaltungsamt – Eichwesen) from February 15, 1993.
For additional information on the CE mark on Sartorius equipment, see Sartorius Publication No. W--0052-e93081.

"EC Verification" – A Service Offered by Sartorius

Our service technicians authorized to perform the verification of your weighing instruments that are acceptable for legal metrological verification can inspect and verify the metrological specifications at the place of installation within the Member States of the European Union and the Signatories of the Agreement on the European Economic Area.

Subsequent Verifications within the European Countries
The validity of the verification will become void in accordance with the national regulations of the country in which the weighing instrument is used. For information on verification and legal regulations currently applicable in your country, and to obtain the names of the persons to contact, please contact your local Sartorius office, dealer or service center.

For more information on the verification of weighing instruments for use in legal metrology, contact the Sartorius Service Center.

CE

Konformitätserklärung zur Richtlinie 90/384/EWG
Declaration of Conformity of Type to Council Directive 90/384/EEC

nichtselbsttätige elektromechanische Waagen
nonautomatic electromechanical weighing instruments

(Alle Daten sind in den Prüfberichten, Bauartzulassungen oder den betroffenen Geräten selbst zu entnehmen)
(All data to be taken from test certificates, type-approval certificates, or instruments in question)

Auswerte-gerät *Indicator*	Typ Auswertegerät *Indicator type*	Typ Waage *Weighing instrument type*	Genauigkeits-klasse *Accuracy class*	EG-Bauart-zulassung Nr. *EC type approval no.*	Prüfschein Nr. Auswertegerät *Indicator test certificate no.*
CI...	TN	SARTICS	(III) (IIII)	D04-09-015	D09-03.13
CIX...	TN-X	SARTICS	(III) (IIII)	D04-09-015	D09-03.13

Elektromechanische Waage
Die Konformitätserklärung gilt, wenn:

- das Auswertegerät als unverändertes Originalmodul verwendet wird.
- die Kompatibilität der Module über das mitgelieferte Programm "KOMPMOD.xls" bestätigt und vom Waagenbauer unterschrieben wurde.
- eine Benannte Stelle der EU geprüft und in einer Konformitätsbescheinigung bestätigt hat:
  * die Übereinstimmung der im Formular (Programm) gemachten Angaben mit Waage und EG-Bauartzulassung.
  * die Richtigkeit der Aufschriften auf dem Kennzeichnungsschild
  * die Prüfung der Waage nach EN 45501 Punkt 8.2
- die Benannte Stelle das Kennzeichnungsschild mit der grünen Klebemarke mit dem Messtechnik-M und ihrer Nummer ausgerüstet und die in der EG-Bauartzulassung geforderten Stellen mit ihren Sicherungsmarken verschlossen hat.

Electromechanical weighing instrument
The Declaration of EC Conformity of Type applies if:

- *The indicator is used as an unchanged original module*
- *The Compatibility of Modules is confirmed by the delivered program "COMPMOD.xls" and signed by the scale assembler*
- *A Notified Body of the EU has tested and confirmed the following in its own Certificate of Conformity:*
  * *the information and specifications on the form (program) conform to those of the weighing instrument and on the EC type-approval certificate*
  * *the marking on the descriptive plate is correct*
  * *the weighing instrument was tested in conformance to EN 45501, section 8.2*
- *The Notified Body has affixed the green sticker with the metrology mark "M" and its number to the descriptive plate, and sealed the positions in accordance with the EC type-approval certificate using the Notified Body's protective marks.*

Sartorius AG
37070 Göttingen, Deutschland / *Germany*
Göttingen, 01.11.2004

Dr. G. Maaz
(Spartenleitung Mechatronik)
(President of the Mechatronics Division)

i.V. J. Rehwald
(Leitung Produktion Mechatronik / Wägetechnik)
(Head of the Production Department Mechatronics / Weighing Technology Division)

OAW-113-2/02.96
P108dea04.doc

Physikalisch-Technische Bundesanstalt

Braunschweig und Berlin

EG-Bauartzulassung

EC type-approval certificate

Zulassungsinhaber: *Issued to:*	Sartorius AG Weender Landstr. 94-108 37075 Göttingen
Rechtsbezug: *In accordance with:*	§ 13 des Gesetzes über das Mess- und Eichwesen *(verification act)* vom*/dated* 23. März 1992 (BGBl. I S. 711), zuletzt geändert am *(last amended on)* 25.11.2003 (BGBl. I S. 2304), in Verbindung mit Richtlinie *(in connection with council directive)* 90/384/EWG, geändert durch *(amended by)* 93/68/EWG
Bauart: *In respect of:*	Nichtselbsttätige elektromechanische Waage mit oder ohne Hebelwerk *Nonautomatic electromechanical weighing instrument with or without lever system*
Typ */ Type*:	SARTICS
	Max 0,5 kg ... 300 t — Option: Mehrbereichs- und Mehrteilungswaage (III) n ≤ 6250 — *multi-interval and multiple range instrument* (IIII) n ≤ 1000
Zulassungsnummer: *Approval number:*	**D04-09-015 1. Revision**
Gültig bis: *Valid until:*	07.04.2014
Anzahl der Seiten: *Number of pages:*	12
Geschäftszeichen: *Reference No.:*	PTB-1.12-4014622
Benannte Stelle: *Notified Body:*	0102

Im Auftrag
By order

Marcus Link

PHYSIKALISCH-TECHNISCHE BUNDESANSTALT 40

Braunschweig, 18.10.2004

Siegel
Seal

Die Hauptmerkmale, Zulassungsbedingungen und Auflagen sind in der Anlage enthalten, die Bestandteil der Revision der EG-Bauartzulassung ist. Hinweise und eine Rechtsbehelfsbelehrung befinden sich auf der ersten Seite der Anlage

The principal characteristics, approval conditions and special conditions, if any, are set out in the Annex which forms an integral part of this Revision of the EC type-approval certificate. For notes and information on legal remedies, see first page of the Annex.

R3-0023

Physikalisch-Technische Bundesanstalt

Braunschweig und Berlin

Prüfschein

Test certificate

Ausgestellt für: *Issued to:*	Sartorius AG Weender Landstr. 94-108 37075 Göttingen
Prüfgrundlage: *In accordance with:*	EN 45501 (1992), Nr. 8.1, WELMEC-Dokument 2.1 (1997) EWG Richtlinie 90/384/EWG, OIML R 76-1
Gegenstand: *Object:* Typ:	Auswertegerät *Indicator* und Terminal *and Terminal* Typ: TN und / and TN-X
Kennummer: *Serial number:*	
Prüfscheinnummer: *Test certificate number:*	D09-03.13 1. Revision *D09-03.13 Revision 1*
Datum der Prüfung: *Date of Test:*	
Anzahl der Seiten: *Number of pages:*	9
Geschäftszeichen: *Reference No.:*	PTB-1.12-4009190
Benannte Stelle: *Notified Body:*	0102

Im Auftrag
By order

Marcus Link

PHYSIKALISCH-TECHNISCHE BUNDESANSTALT 49

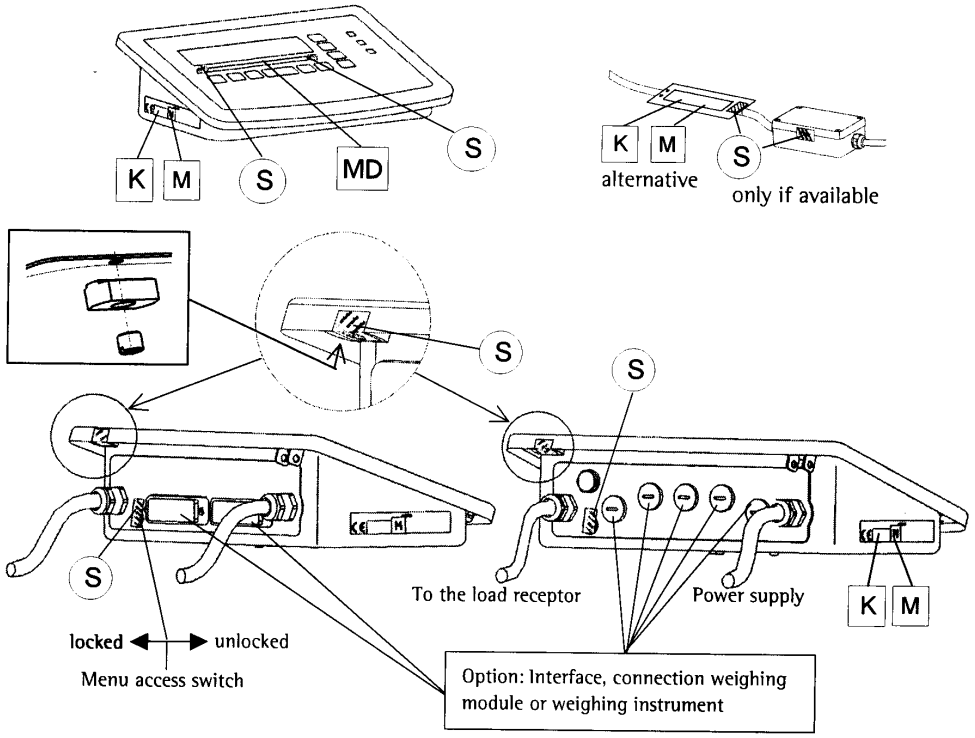
Braunschweig, 31.10.2003

Siegel
Seal

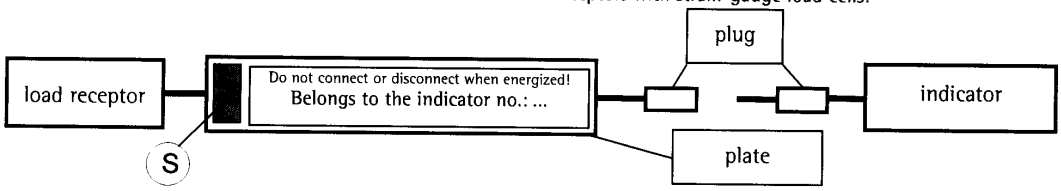
R3-39200

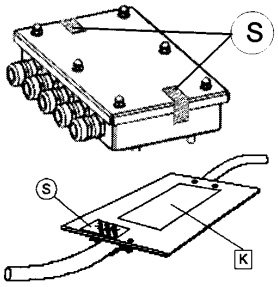
Hinweise siehe erste Seite der Anlage, die Bestandteil des Prüfscheines ist.
For notes, see first page of the Annex which forms an integral part of the test certificate.

Plates and Markings CIS1 / CIS1N / CIS2 / CISL1 / CISL1N / CISL2 (Type TN)



Alternative: Disconnectable connection between indicator and load receptors with strain-gauge load cells:





If there is a junction box between load receptor and electronic evaluation unit the junction has to be secured against inadmissible manipulation.

Alternative place for the Descriptive Plate of the weighing instrument
Handling in this case:
Affix the ID label of the weighing instrument to the delivered tag plate. Affix the ID tag plate to the data cable of the weighing module near the indicator. The verification officer or an authorized Sartorius representive must then seal the ID tag plate to the fastener.

M Mark for EC verification (green metrology sticker)

K Descriptive plate with CE-conformity

S Protective mark

MD Metrological data: Max, Min and e

PPC011004e

Type weighing instrument: SARTICS Type indicator: TN
EC type-approval certifcate D04-09-015 + Test certificate D09-03.13

Example of descriptive plate of the already verified weighing instrument [K]



Example of plate with model designation [T]



Labels for entering metrological data [MD]

ΔΔ	R	Max	Min	e=	d=
ΔΔ	R	Max	Min	e=	d=

Example:

ΔΔ	R 1	Max	3kg	Min	20g	e=	1g	d=	1g
ΔΔ	R 2	Max	6kg	Min	40g	e=	2g	d=	2g

...

...

In case of using as an indicating and operator terminal for weighing modules

- The same locations for protective marks are valid at the terminal
- A disconnectable connection between indicating and operator terminal and weighing module needs not to be secured with a protective mark
- For verification the regulations (Protective marks at the weighing module, fixing of the descriptive plate, etc.) of the weighing module have to be disregarded. To connect a weighing module the menu access switch of the Terminal must be set to the "unlocked" position. The serial number of the weighing module is stored in the Terminal and the Terminal is only working with this weighing module. After connecting the weighing module the menu access switch of the Terminal must be set to the "locked" position for verification. The weighing module has its own descriptive plate. The requirements of the approval no. D97-09-018 are valid.
- As well the metrological data of the weighing module have to be attached under the display and have to be secured against manipulation.

Example of label with metrological data for a connected weighing module

ΔΔ	2	R1	Max	34	kg	Min	5	g	e=	1	g	d=	0,1 g

PPC011004e

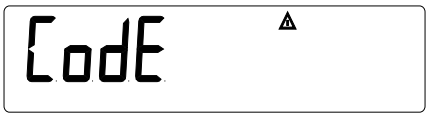
Type weighing instrument: SARTICS Type indicator: TN
EC type-approval certifcate D04-09-015 + Test certificate D09-03.13

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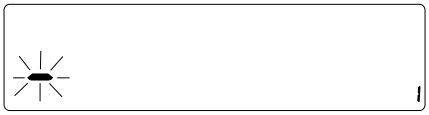
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General Password



When you select “Setup”, the password prompt is displayed for 2 seconds.



The first cursor position of the password flashes.

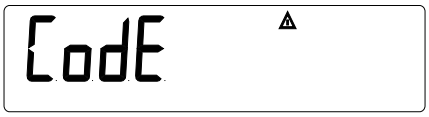
Fn repeatedly , →T← ;
Fn repeatedly , →T← ;
Fn repeatedly , →T← ;
Fn repeatedly , →T← ;
Fn repeatedly, →T← ;
Fn repeatedly, →T← ;
Fn repeatedly, →T← ;
Fn repeatedly, →T← ;

Entering the password:
– Press Fn to select numbers and press →T← to confirm.
Press either Fn (to scroll through numbers from 0 up to 9) or ⊟ (to scroll from 9 down to 0) repeatedly until the desired number is displayed.

The password is shown on the display.

→T←

Confirm the password entered.



→0←

Exit current menu level



Press and hold →T← (> 2 sec.)

Store input and exit the Setup menu



General password:
40414243

Service password:
202122

Appendix: “Guide to Verification”

Proof of Compatibility for Modules used with Non-Automatic Weighing Instruments
The Excel file on this CD makes it possible to create the documents required for verification of a scale for legal metrology. This file can be saved and archived (for example, on the PC) under a name of the user’s choosing.

The printout of the completed forms is valid as a model for verification of the weighing instrument produced by the scale manufacturer. Once the forms have been properly completed and signed by the scale manufacturer, they are submitted to the weights and measures officer and serve as proof of compatibility for the weighing instrument.

Information important to the weights and measures officer may include the type approval certificate, the test certificate, or a test report. Manufacturer information about the load cell or the indicator may be useful as supplementary information.

System Requirements

Minimum System Requirements:
- PC 486DX / 33 MHz
- Mouse
- 8 MB RAM
- Windows® 95/NT
- MS Internet Explorer®
- Double-speed CD-ROM drive
- Software: MS Excel® version 8 (included with MS Office 97) or later
- VGA graphics adapter, 800x600 pixels, 256 colors

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Installation
- Insert the CD in the CD-ROM drive.
- If the program does not start automatically, double-click on the “Start.pdf” file stored on the CD to run the program.
  To locate this file, run the Microsoft Explorer (e.g., by double-clicking on the “My Computer” symbol) and select the drive letter of your CD-ROM drive.
  To exit the program, use the “Alt+F4” keyboard shortcut (i.e., hold down the “Alt” key and press the “F4” key).
  Click on the corresponding flag to select the desired language.
  On the next page, click on “ReadMe” to open this file or on “Indicators” to begin using the program.

Using the Program

ReadMe File
Make sure you have read the entire ReadMe file before using the program, as it contains important information about how to use the Excel file and offers useful tips on how to fill out the documents.

After reading this file, click on “Indicators” to begin using the program. On the next page, select the desired indicator model or series. This opens a list of options for use of the program.

Documents
Click on “Documents” to open a list of all documents that are relevant for the declaration of compatibility.

Start
- Click on “Start the Excel Program” to run the dedicated Excel program.
  The required Excel file is opened automatically.
  Depending on the settings in your system, a dialog box for selecting the macro may appear. Otherwise, you may need to reset the security level for Excel macros, and/or select the “Activate macros” option before you continue.
  Fill out all fields on the “Data-input” page (highlighted in yellow).

> For an example of a completed form, go back to the page with the “Start the Excel Program” option and select “Sample File” instead. Another option, “Explanation of the Excel Program” presents details on the fields that are marked in yellow.

- Each of these information files has “Back” buttons for returning to the program.

- Once the technical specifications have been entered correctly (according to the information provided by the manufacturer), the program calculates all values automatically.
  Under “Weighing instrument (WI)” there is a list box in the second column; click on the down arrow to select the appropriate type of weighing instrument; e.g., single-range weighing instrument, etc.

> The fields should be filled out by an expert.
  On page two, the fields marked in green or red show whether the components (load cell and indicator) are compatible: red = incompatible; green = compatible.

> Note: The scale manufacturer who configures a weighing instrument from individual components (indicator and load cell(s)) is responsible for the technical information in the document.
  Once all of the data has been entered correctly (all fields on page 2 are marked green), print out both pages. Check the information and sign the data sheet.

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